

THE IRON AGE

DUCTION -- MANAGEMENT

OCTOBER 19, 1933

PROCESSES -- NEWS

OCT 20 1933

If You Make Metals or Mechanisms...

Three groups of forces are at work changing your manufacturing and marketing picture.

One of these groups comprises powerful pre-depression factors which will continue to affect business for years to come. For example, the increasing gain of productive capacity over normal demand.

In a second group are the depression factors: customer mortality, turnover in buying personnel, altered importance in relations between large and small units, etc.

The third group comprises the Recovery Administration factors, such as the mandatory increase in manufacturing costs, price stabilization, the general relaxing of labor's productive effort, etc.

These and other powerful forces are rapidly introducing new problems and new difficulties into the already complex fields of manufacturing and merchandising.

The editorial pages of The Iron Age are planned to give you timely and helpful service through the accurate recording and the intelligent interpretation of the effects of these factors upon *your* business.

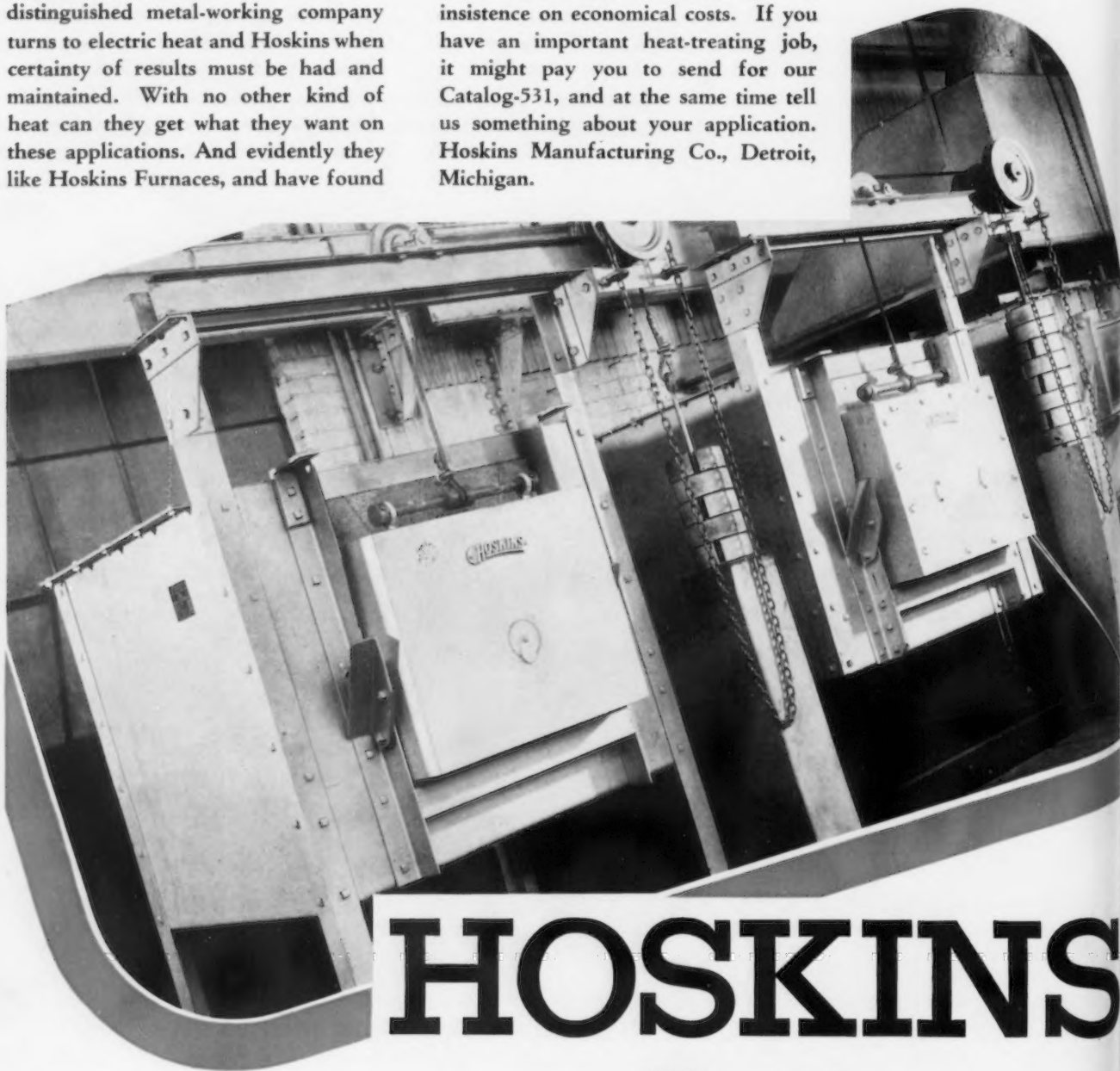
"BOHN ALUMINUM" PREFERS ELECTRIC HEAT

These two (of five) Hoskins Electric Furnaces are in the plant of the Bohn Aluminum Co., where they are used on an application of vital importance. The details cannot be told, but the installation is featured to show that this distinguished metal-working company turns to electric heat and Hoskins when certainty of results must be had and maintained. With no other kind of heat can they get what they want on these applications. And evidently they like Hoskins Furnaces, and have found

the Chromel elements durable, and the all-round maintenance satisfactorily low. A similar story could be told about Hoskins Furnaces thru-out the automotive industry, noted for the excellence of its heat-treatment and its insistence on economical costs. If you have an important heat-treating job, it might pay you to send for our Catalog-531, and at the same time tell us something about your application. Hoskins Manufacturing Co., Detroit, Michigan.



*The Wire that Made
Electrical Heat Possible*



HOSKINS

Electric

FURNACES

THE IRON AGE, published every Thursday by the IRON AGE PUBLISHING CO. Publication Office: N. W. Cor. Chestnut & 56th Sts., Philadelphia, Pa. Executive Offices: 239 W. 39th St., New York, N. Y., U. S. A. Entered as second class matter at the Post Office at Philadelphia under Act of March 3, 1879. \$6.00 a year in U. S., Canada \$8.50, Foreign \$12.00. Vol. 132, No. 16.

▲▲ THE IRON AGE ▲▲ October 19, 1933 ▲▲

J. H. VAN DEVENTER
Editor
F. J. WINTERS

F. L. PRENTISS
Cleveland

G. L. LACHER
Managing Editor
G. EHRENSTROM, JR.
Pittsburgh

R. A. FISKE
Chicago

W. W. MACON
Consulting Editor

A. I. FINDLEY
Editor Emeritus

T. H. GERKEN
News Editor

BURNHAM FINNEY
Detroit

L. W. MOFFETT
Washington

R. E. MILLER
Machinery Editor
GERARD FRAZER
Boston

R. G. MCINTOSH
Cincinnati



CONTENTS

Equilibrium	9
Fabricating Water Gates for Boulder Dam	10
An Electric Power Famine Approaches	14
Coke-Fired Reheating Furnace	17
Choosing the Right Drive	18
Walking-Beam Type Forging Furnace	22
Cast Iron for Machine Construction	24
New Materials and Processes	28
Gas Furnaces in Bolt and Nut Plant	30
Experiences With Tungsten-Carbide Saws	31
Putting the Question Mark to Work	32
New Equipment	33
Railroad Freight Rates on Pig Iron (Insert)	35
News	39
Personals and Obituaries	41
Automotive Industry	43
Washington News	45
Markets	51
Construction and Equipment Buying	68
Products Advertised	98
Index to Advertisers	116

▲▲▲

THE IRON AGE PUBLISHING COMPANY

F. J. FRANK, President G. H. GRIFFITHS, Secretary C. S. BAUR, General Advertising Manager

PUBLICATION OFFICE: N. W. Corner Chestnut and 56th Sts., Philadelphia, Pa.

EXECUTIVE OFFICES: 239 West 39th St., New York, N. Y., U. S. A.

Member, Audit Bureau of Circulations
Member, Associated Business Papers

Published every Thursday. Subscription Price:
United States and Possessions, Mexico, Cuba, \$6.00;
Canada, \$8.50, including duty; Foreign, \$12.00 a
year. Single Copy 25 Cents

Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 311 Union Bldg., Cleveland
B. L. Herman, 675 Delaware Ave., Buffalo, N. Y.
H. K. Hottenstein, 802 Otis Bldg., Chicago
Peirce Lewis, 7338 Woodward Ave., Detroit
Charles Lundberg, 45 Kent Rd., Upper Darby,
Del. Co., Pa.
C. H. Ober, 239 West 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
W. C. Sweetser, 239 West 39th St., New York
D. C. Warren, P. O. Box 81, Hartford, Conn.

SEVENTY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY



The
"Key" to
Immediate
Steel—



The Ryerson Stock List gives you quick, direct reference to data on practically all steel lines. Use this data book for quick reference in purchasing your current steel requirements.

If you do not have the Ryerson Stock List, mail this coupon, and we will be glad to forward a copy.

Name

Firm

Street

City State

Ten Thousand Sizes and Kinds of Steel Products Ready to Ship

—Large stores of steel and allied products that offer unusual possibilities for concentrating purchases and thus saving time, trouble and money. The diversity of stocks, the wide range of sizes carried, with prompt service assured, provides an economical source for those following the generally accepted hand-to-mouth buying methods.

There are ten Ryerson plants. Each plant is strategically located to serve its own industrial area. In every plant there is a strong, experienced organization with not only the desire, but the ability to serve.

You will find many advantages in grouping orders for immediate shipment from your nearest Ryerson Steel-Service plant.

PARTIAL LIST OF PRODUCTS ALWAYS IN STOCK

Bars	Turned, Ground and	Babbitt Metal
Structurals	Polished Shafting	Allegheny Metal
Rails	Strip Steel	Alloy Steel
Plates	Rivets and Bolts	Tool Steel
Sheets, Blk. & Galv.	Boiler Tubes	Concrete Reinforcing
Sheets, Full Finished	and Fittings	Firmtread Plates
Refined Iron	Welding Rods	Small Tools
Screw Stock	Forging Bars	Machinery, etc.

JOSEPH T. RYERSON & SON, INC., Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON STEEL-SERVICE

▲▲▲ THE IRON AGE ▲▲▲

OCTOBER 19, 1933

ESTABLISHED 1855

Vol. 132, No. 16

Equilibrium



CENTRIFUGAL force keeps the Earth from rushing into the Sun. The force of attraction keeps it from flying away from it. Thus, through this nice balance of forces, the human race is kept from being consumed by heat or perishing from the lack of it.

Social equilibrium has been maintained, even though in crude fashion, by the balancing of opposing opinion in politics, religion, legislation and litigation. Overwhelming majorities have hitherto been considered undesirable because of their tendency to overlook the rights of minorities.

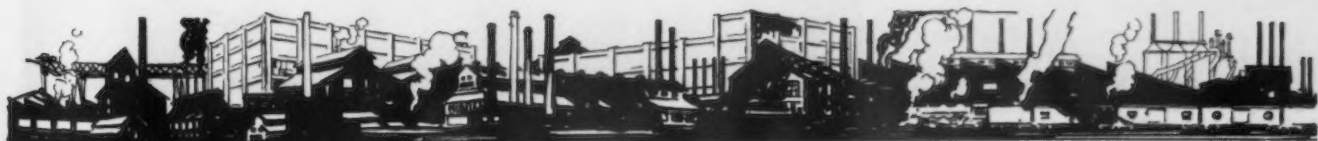
ALL of which brings up the question: What would happen to us if and when the A. F. of L. should reach its professed goal of 20,000,000 membership?

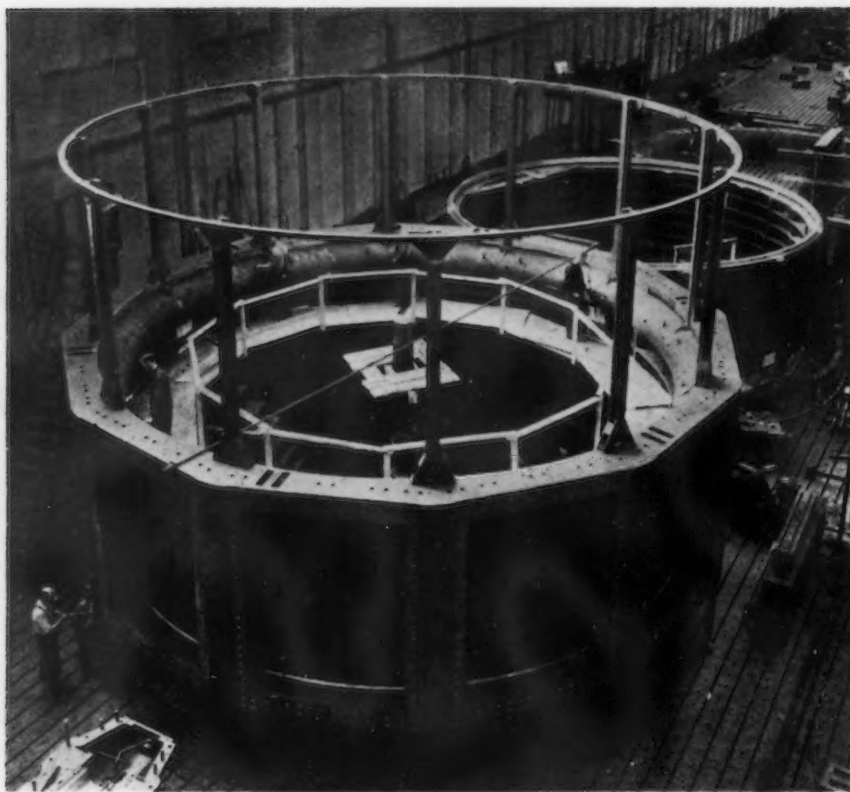
General Johnson answered this question, during his address to organized labor last

week, by stating that a labor majority such as this would naturally have to submit to government control. "Fully organized and unchecked labor," said he, "could exploit and dominate a whole nation."

WE are inclined to ask General Johnson who he thinks would compose the government which is supposed to do this regulating, when and if the A. F. of L. should control 20,000,000 votes out of a total number cast of less than 40,000,000?

If the representatives of a mere two or three million organized workers have demonstrated their ability to so dominate politics and policies as to twist the emergency Recovery Act, professedly a temporary measure, into a serious threat of permanent abrogation of well-defined constitutional rights, what could they not accomplish with tenfold power?





Complete shop assembly.

BUILDING the eight very large gates that are to control the supply of water to the turbines at the Boulder Dam installation is an outstanding development because of the size of the project and the problems involved.

The Westinghouse company is in a position to carry out the building of these gates because of the experience of its organization in the development and use of electric welding, which enters so largely into their construction and which it has used so extensively in its electrical machinery, and because of its shop equipment for handling large work. The close tolerances required in the machining of the gates correspond to those of electrical machinery. The adaptability of electrical welding is also shown by the readiness with which special fixtures can be made to facilitate some of the operations.

The size, the accuracy required, and the fabrication by welding are the most noteworthy features of these gates.

Since this installation is to be the largest ever made and the forces controlled of such magnitude it was necessary to choose a design and a material that would have the largest factor of safety, and that would offer maximum freedom from hidden defects.

This led to the selection of a fabricated and welded structure for the two main parts of this installation, namely, the 32-ft. diameter main cylindrical gate to be raised and lowered

to entirely shut off the water flow, and the 36-ft. diameter nose liner supporting the concrete water tower and leading the water into the penstock at the base. Another similar installation but of lighter construction is to be placed 150 ft. above the base to be used for the same purpose.

Fabricating the

ENGINEERING ingenuity, as well as organization experience in fabrication of large steel parts by welding, is reflected in this brief description of building the eight gates that are to control the water supply to the turbines at Boulder Canyon. These huge structures not only had to be designed from the "ground up" for welding, but numerous special fixtures and other production facilities had to be devised to assure joints of maximum strength, economical handling, and welded units that would fit properly in the final assembly. More than 80 welders, qualified under code specifications, were employed on this work. All parts were positioned so that the welding could be done horizontally.

A brief review of the principal features of this development will indicate its magnitude. The plan includes:

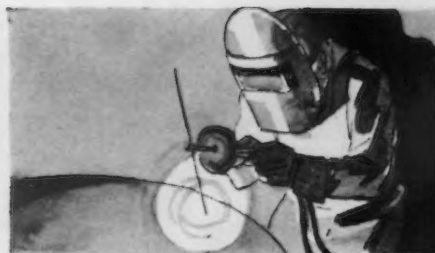
- 1—Construction of a dam at Black Canyon, in the Colorado River, large enough to control the flow of the water at all



Fig. 1—Edge bending rolls for forming the circumferential ribs of gate segments.

Building the Water Gates for

Boulder Canyon Project



times, to provide flood storage, to store water for irrigation and domestic use.

2—Excavation of the All-American Canal to conduct, for irrigation purposes, water from the Colorado River to a point above Yuma, Ariz., to the farm lands in southeastern California.

3—Construction of a power plant immediately below the dam to generate electrical energy, the sale of which would make the entire project self-liquidating.

The power plant will develop 1,835,000 hp. The hydraulic turbines will operate under an average head of 520 ft., the minimum and maximum heads being 420 and 590 ft., respectively.

When completed the dam will be the highest and largest ever constructed. It is to be of the arch-gravity type, 45 ft. above the foundation rock. Its length along the top will be 1180 ft. It will contain about 3,400,000 cu. yd. of concrete masonry, and 1,000,000 cu. yd. more will be used for the power house and related structures. Pressure of water on the upstream face at the base of the dam will be about 45,000 lb. per sq. ft., and the total pressure, about 3,250,000 tons.

The reservoir created will be the largest artificial lake in the world, measuring 115 miles in length and ranging from a few hundred feet at the dam to 8 miles in width. When filled it will contain over 30,000,000 acre-feet or about 11,000,000,000,000 gal. Under normal flow it will require over two years to fill the reservoir.

Two Water Gates for Each Intake Tower

The water to be carried from the reservoir past the dam to the turbines of the power plant, or to outlet works, will pass through four 30-ft. diameter penstock headers. Controlling the flow to the penstocks are four reinforced concrete intake towers, two on each side of the canyon.

Each intake tower is equipped with

By C. C. BRINTON

Superintendent, Generator Division,
Westinghouse Electric & Mfg. Co.,
East Pittsburgh

two cylindrical water gates, one at the bottom, the lower gate, and one 150 ft. above, the upper gate. The total height of the towers is 338 ft.

The cylindrical gate valves and the nose liners at the inside circumference of the tower are built up of steel plates welded together by the fusion arc process. Each complete cylindrical gate valve and nose liner consists of six segments, which are machined

at the partings and bolted together to form the complete cylinder.

Each lower gate valve weighs 240,300 lb. and each upper gate valve 150,000 lb. The material required for the gates is as follows:

	lb.
Copper-bearing steel plate..	3,440,000
Ferrous castings.....	850,000
Bronze strips and castings..	87,500
Monel metal seats.....	111,240
Monel metal screws and bolts	15,000
Stainless steel bolts.....	34,000
Steel bolts, studs and nuts..	30,000
Structural steel shapes.....	14,500
Welding rod.....	20,000
Total	4,602,240

Copper-bearing flange quality steel rolled into standard plates and bars



Fig. 2—Assembly fixture for gate segment ribs.



Fig. 3—Welding fixtures (above) for details of gate segments.



Fig. 4—Assembly fixture (below) for the gate segments.

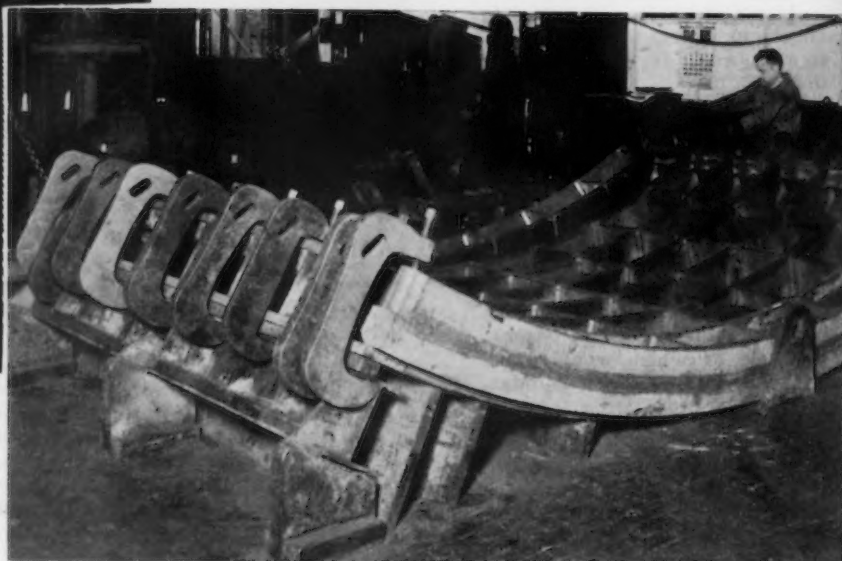
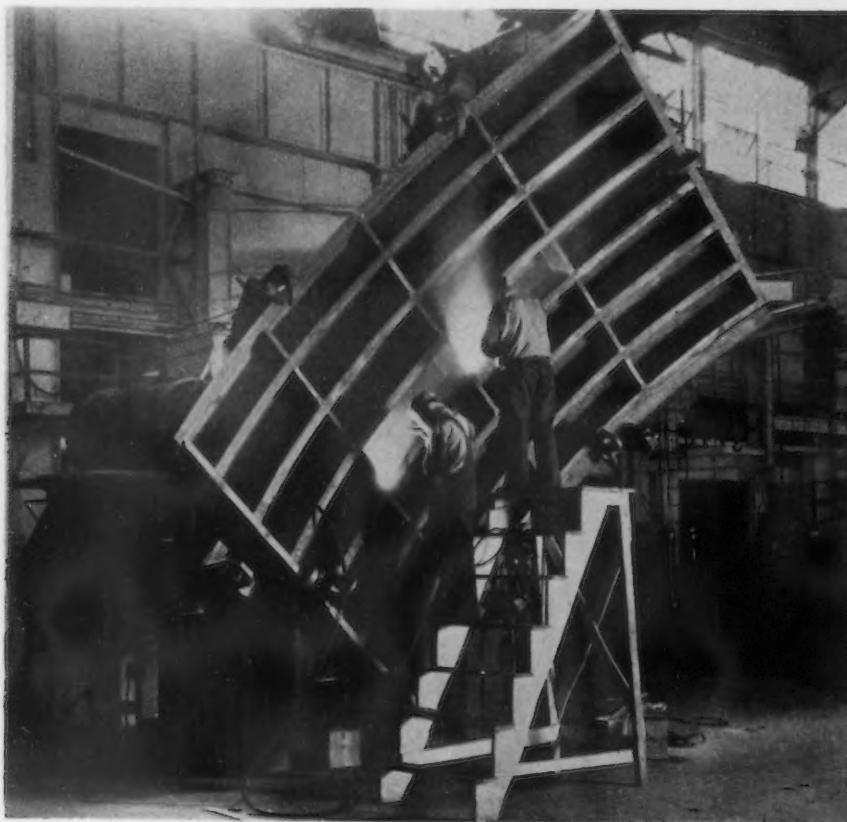


Fig. 5—Rotating fixture (below) for welding the bracing ribs and end plates while positioning the segments.



forms all the main parts for both the cylindrical gates and the nose liners.

Gate Segments Made of 2-in. Plate

The lower cylindrical gates are made up in six segments, forming the complete cylinder. The outer shell of each segment consists of a 2-in. thick steel plate bent to the proper diameter and reinforced with 2% by 11 1/4-in. bars edge bent to fit the inner diameter of the outer shell. Between each rib are bracing plates 1 1/2-in. thick to provide stiffness in the vertical direction. The circumferential ribs and braces are continuously welded to each other and all are joined

to the outer shell with 1/2-in. fillet welds.

The ends of the ribs are machined accurately after welding to assure a perfect fit for the heavy plates at the splits, and these plates are also welded to the outer shell and to the circumferential ribs.

To secure maximum weld strength all welding is done with Westinghouse heavily-coated welding rods, and each part is positioned so that the welding is done horizontally. It is necessary to meet the boiler code specification for Class 2 welding for all of these parts. To carry out the work in the time allowed it was necessary to qualify approximately 80 welders under the boiler code specification.

The circumferential ribs were rolled on a bar mill in lengths sufficient to make a half circle, and were then bent into the proper diameter on an edge-bending roll as shown in Fig. 1, after which they were cut into segments of the proper length.

An assembly fixture (Fig. 2) was used to position the braces, which were then tack welded in place; the tack welded piece was then placed in a welding fixture (Fig. 3) for positioning while welding the braces to the ribs.

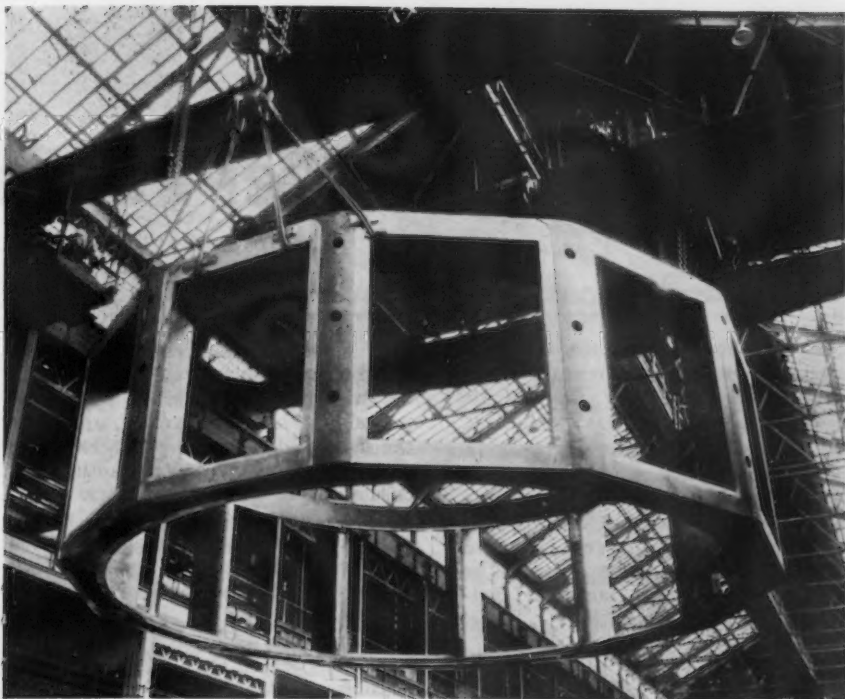
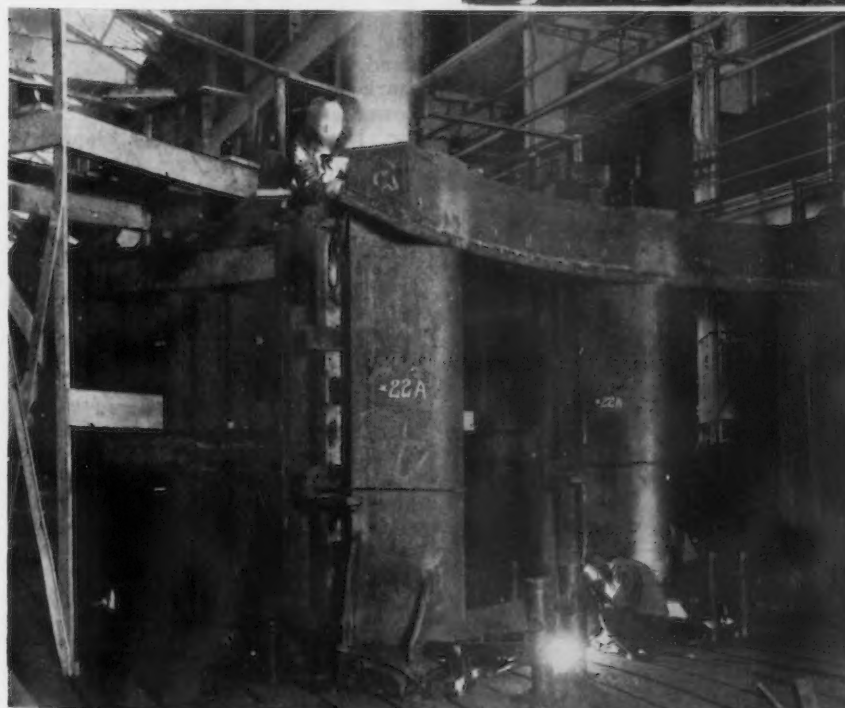


Fig. 6. Complete nose (above) liner assembly partly machined.

Fig. 7. Fixture (at right) for the assembling of the warped plates to the nose liner parts.



Fig. 8. Tack welding the parts of the nose liner segment together in the assembly fixture.



An assembly fixture was used to make up a complete segment to insure that the outer shell was the correct diameter and shape and that the ribs were in intimate contact with the shell before tack welding the structure together, preparatory to welding. This fixture is shown in Fig. 4. It was found necessary to use rather heavy tack welding in order to keep the heavy parts in place when applying the final welds, and to work out a welding procedure that would avoid large welding stresses and cracked welds.

For welding the ribs in place the segments were simply leaned up against a heavy brace and rolled on the outer diameter to keep the part in the proper position for horizontal welding. For the final welding of the braces and end-plates a heavy fixture (Fig. 5) was necessary so that the complete segments could be rotated vertically and horizontally to bring any part into proper position for horizontal welding. This fixture was constructed so that the segment was balanced on the end of a heavy shaft

supported in two large bearings. The clamps holding the segment were pivoted on a pin at the end of the shaft so that the segment could be rotated on the pin and also rotated by turning the shaft. With this fixture two men could weld at the same time, and the moving of the gate segment was made comparatively easy, requiring only a fraction of the welding time.

For welding the angle plates and outer shell to the main segment, two of the pieces were braced together for support, and two welders were able to work on each segment at the same time.

The nose liner from which the water flows directly into the main penstock, consists of a circle of six segments

(Concluded on Page 72)

▲ ▲ ▲ An Electric Power Famine ▲

THE whole problem of the cost of power in the industrial plant has been subjected to such a barrage of claims and counter claims by those who have been interested in selling something to the plant executive that it has been quite difficult in the past to find one's way through the clouds of poison-gas. On the one side have been the public utility publicity experts pointing out the undeniable fact that the central station, being a mass producer of just one thing, power, ought to and usually does produce power at the most highly efficient rate possible. This means today a kilowatt to the pound of coal. On the other side have been the manufacturers of steam, oil and gas power producing equipment, pointing out the equally undeniable fact that the central station's cost of production and its selling price per kilowatt hour are two widely divergent quantities . . .

A generation of controversy, however, has made us all keenly aware that nine-tenths of the dispute (like most of the international controversies that disturb the peace of the world) has been caused by a lack of tolerance for the point of view of the other man, and an understanding of the fact that his different point of view is usually based on different grounds. When the problem is reasonably analyzed it is evident that a number of conditions govern both the manufacture and the use of power; and that certain combinations of

these conditions will favor the purchase of power, while certain other combinations will show the private power plant to be the most economical.

In any normal situation (that is, when central station power is available to the limit of a manufacturer's requirements) the actual cost of purchased power and its acknowledged dependability of supply must be weighed against these factors of private power plant operation:

1. The investment cost of the plant and its equipment.
2. The labor cost required to operate and supervise it.
3. The maintenance cost required to keep it up.
4. The cost of fuel, lubricants and water.
5. The cost of any production-stopping breakdown.

Power Problem Becomes a Triangle

Facts and figures galore have been accumulated during the past third of a century, sufficient to establish a definite basis for the calculation of the problem for any conceivable situation. In very recent years, however, the oil engine has been brought to such a state of perfection that most of the old comparisons have been out-moded. It is no longer simply a question of line-power vs. steam power, for the newer element of proved oil-engine power has produced a triangular contest in which the newcomer is packing a very hearty wallop. In view of the fact, therefore

that careful consideration ought to be given to the private power plant because of the possibility of an approaching electrical famine, and since the case of the steam plant has been stated so frequently that another discussion of it would be a work of supererogation, the data of this article will be confined to a statement of the most recent facts obtainable on oil-engine operation as compared to purchased power costs.

In order to make clear some of the conditions which should limit the discussion, these statements will be made:

First, if purchased power can be had at a net cost (including demand charges and low power factor penalties, if any) of about $1\frac{1}{2}$ c. per kw. hr., you are probably very close to rock bottom, and except where some unusual situation obtains, it will be difficult to establish a case for the private power plant on economic grounds alone. The private plant operated by natural water power or by natural gas available at a very low rate, is an exceptional case and must be considered as such, just as is the steam plant using factory waste for fuel.

Second, for the more usual cases, the availability and cost of both fuel and water have a direct bearing on the problem, for with cheap, good fuel and cheap, good water near at hand, the private plant may show marked economy over purchased power even at rates below $1\frac{1}{2}$ c. per kw. hr. On the average, however, that figure is low, and stands comparison with the best that an ordinary private plant could show, especially when the intangible value of not having the responsibility of operating the private plant is thrown into the scales.

But at purchased power rates higher than $1\frac{1}{2}$ c. per kw. hr. the private plant has a real case. Here, until very recently, a somewhat arbitrary line has been set up between manufactories which use low pressure steam for various process purposes, and those which do not. It has been widely held that, if process steam is required, a steam plant is indicated. This contention has been lately answered, however, by utilizing the heat in the circulating water of oil engines to generate steam for low pressure process work in special waste-heat apparatus, thus making the oil



A Step Beyond the Tread Mill

ONE of the earliest forms of mechanized power was the windmill. It was a distinct step forward from the primitive treadmill, typifying man's urge to harness natural forces.

Approaches—Part III

By FRANCIS JURASCHEK

Analyzing Diesel-Electric Possibilities in Comparison

with Use of Utility Power

engine plant available for practically all types of industries.

Thermal Efficiencies

Normally, the efficiency of a power plant prime mover is measured by the ratio of the thermal units actually utilized for power purposes, to the thermal units contained in the fuel consumed. That ratio, in the case of very high types of steam power plants, using high-pressure, superheated steam in turbines or in condensing engines, is about 18 per cent. In simpler types of steam plants, with non-condensing engines, it may run as low as 5 per cent. On the other hand, the modern Diesel-type oil engine turns to practical account some 32 per cent to 35 per cent of the thermal units in the fuel consumed, and where the heat of the circulating water is utilized to generate low pressure steam, to heat radiators, or for process work direct, the actual efficiency may run as high as 50-60 per cent.

A practical example, analyzing the cost conditions affecting a medium size Diesel-electric industrial plant will serve to show the principal factors involved in a comparison with purchased power. It must be borne in mind that the figures used are very conservative. They are higher than would obtain where conditions are particularly favorable for Diesel engine operation, yet lower than have been recorded for some well-known installations. They are the fairest averages possible to obtain, however, for they have been taken from the reports of the oil engine power cost sub-committee of the American Society of Mechanical Engineers, and are based on analysis of investment and operating cost records of 107 engines in 1929, 253 engines in 1930, and 330 engines in 1931; installed in municipal, in utility and in industrial plants.

Let us assume, then, that in a given manufacturing plant there will be needed in the course of one year, 500,000 kw. hr. supply of electrical current, with the maximum demand

THIS is the third of a series of three articles dealing with the evident possibilities of a shortage in electric power production. In this concluding chapter, the author calls attention to the possibilities of private power production due to the rapid developments in the Diesel-electric field. Methods of comparing costs are outlined as a means of arriving at sound opinion.

established at 225 kilowatts, and that the entire plant operates at an 80 per cent power factor load. If power can be purchased at 1¼c. per kw. hr., and the connected load charge is \$15 per kw. per year (this is sometimes called "demand rate" and is then charged at \$1.25 per kw. per month for the highest demand recorded during the month), the total bill for power for the year will be \$9,625, or an average of 1.93c. per kw. hr.

The first consideration to bear in

mind in figuring the costs of a private plant to furnish the same power is that of plant load factor. Practically no industrial plant today would find it necessary to call upon its power producing equipment to furnish a full capacity 24 hours a day, 365 days in the year, or 100 per cent of plant capacity load. The general average use for the year is 30 per cent or less. Thirty per cent plant load factor is equivalent to the use of full capacity during 2628 hr. of the 8760 hr. in the year. For purchased power, this factor has no significance to the user; but for the private power plant operator it means that he will use but 30 per cent of the capacity of his investment, and that his costs per kw. hr. used must needs be higher than if he were able to utilize a larger part of his investment continuously.

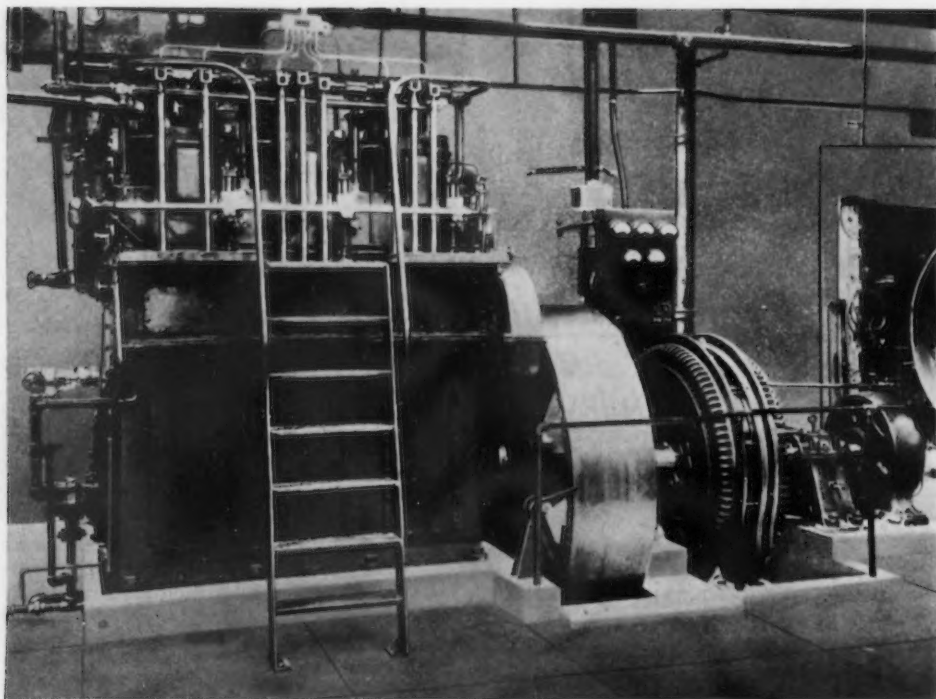
Cost of Diesel-Electric Power

A possible Diesel-electric plant to furnish the power required would be three 120 hp. engines, each driving a 95 kva. alternator. At 80 per cent

A Long Time Purveyor of Power

WATER power has been perhaps the most important of man's power sources. It has been at work for centuries and is at work today in many of our most modern and efficient power plants.





A SMALL industrial installation of conventional appearance. The 150 hp. Diesel is direct connected to a 156 kva. 240 volt, 60 cycle, three-phase alternator.

power factor load this would represent a plant capacity of 228 kw. At 30 per cent of annual capacity, this plant could turn out 599,184 kw. hr. Since but 500,000 kw. hr. are to be used, the average load factor would be about 84 per cent. At this figure fuel consumption per kw. hr. will be low, lubricating oil economy high, and wear and tear not excessive; in fact the operating conditions are decidedly favorable for Diesel engines.

Taking median figures as reported by the oil engine power costs subcommittee, the investment cost (exclusive of real estate or a building in which to house the equipment) would run to about \$100 per installed kw., or \$22,800. The price of fuel oil would be 4c. a gallon, and at 84 per cent operating load factor each gallon should produce 11.5 kw. hr. Lubricating oil would cost 50c. per gallon, and each gallon would last 1250 kw. hr. For this size plant, 9 mills per kw. hr. would cover the labor costs; that is \$4,500 per year, of a chief engineer and a watch engineer. Maintenance and repairs must be figured at 2 per cent of investment cost; and amortization, including interest at 6 per cent, depreciation over 20 years, insurance at 1½ per cent and taxes at the same figure, are all included in a combination 11½ per cent of the investment cost.

Operating costs, therefore, will be about as follows:

Fuel oil.....	\$1,730	or 0.35c. per kw. hr.
Lube. oil	200	or 0.04c. per kw. hr.
Labor	4,500	or 0.90c. per kw. hr.
Maintenance .	456	or 0.09c. per kw. hr.
Amortization .	2,672	or 0.53c. per kw. hr.
Total	9,558	or 1.91c. per kw. hr.

And this does not include the cost of water, or of water purification; for if the water is high in scale-forming qualities it must be softened before it can be used as a circulating medium around the engine cylinders. Against this, on the other hand, may be set any utilization which may be made of the heat in this circulating water; whether for radiator heating, process cooking, or low pressure steam generation. A small profit may be made on any of these factors, and the net cost of power be reduced thereby.

Amortization Charges Sometimes Omitted

It will be noticed that amortization charges of almost 6 mills per kw. hr. are included in these operating charges. It is an almost universal practice of Diesel engine salesmen to omit this figure from the calculation of operating cost, and to utilize the savings as compared with purchased power costs as an argument for establishing a means of paying for the installation. If we apply this method to the example above, interest and depreciation amounting to 8.72 per cent should be taken out, lowering the figure given by \$1,988 per year, or 4 mills per kw. hr. The operating cost would then be \$7,571 per year, as against \$9,625, the cost of purchased power. Dividing this saving into the investment cost indicates that the plant would pay for itself in a little over eleven years.

Now, it must not be thought that the comparison made is at all conclusive. Conditions vary so widely that a hard and fast rule cannot be laid down. In every individual situa-

tion due consideration must be given to a number of factors that may well turn this comparison topsy-turvy.

For instance, the plant considered is a small one, as many recent Diesel installations go. In a Diesel plant four times as large no greater labor force is required. Where plant capacity factor exceeds 30 per cent both labor and fixed charges will be lessened per kw. hr. produced. On the other hand water rates may be high, water purification may be necessary, and fuel oil laid down in the plant may cost more than 4c.

To know for a certainty that the modern Diesel engine is an efficient, low-cost prime mover, capable of delivering a sure supply of cheap power under almost every condition of operation that may be encountered, one must not only weigh with care all the local conditions which govern the situation, but examine the records of many different types of installations; sometimes even scanning facts from far afield.

One manufacturer of large trunk piston, high speed Diesels reports recent installed costs of Diesel-electric equipment, including real estate and building, of \$81.50 per kw. Practically all Diesel manufacturers have made such recent improvements as tend to lower the cost of operating labor. More efficient performance, both as to fuel oil and lubricating oil consumption per kw. hr., is available today than could be had a few years ago. And the more recent installations everywhere are, in general, showing such performance records as would be considered unbelievable a decade ago.

For instance, last year the Union Stockyards in Chicago added a 3000 hp. Diesel to its existing steam and purchased power supply, and saved \$60,000 the first year of operation. Two 330 hp. oil engine generating units and two 110 hp. oil engine air compressors in a Texas asphalt mine average but 0.4 lb. of fuel per hp., and 4000 hp. hr. per gallon of lubricating oil. This is far below the cost of purchased power. A Minnesota flour mill with three 800 hp. and one 360 hp. Diesel engines ran for six months recently at an operating cost (less interest and depreciation) of 6.4 mills per kw. hr. And another milling company with two 750 hp. Diesels now generates its own electricity at 9 mills per kw. hr. as compared with a rate of 1.47c. per kw. hr. for purchased power.

In the average low cost electrically operated ice plant, ice costs about one dollar per ton on a 50 per cent season factor. Yet a Baltimore concern with 310 hp. Diesels reduced the fuel and

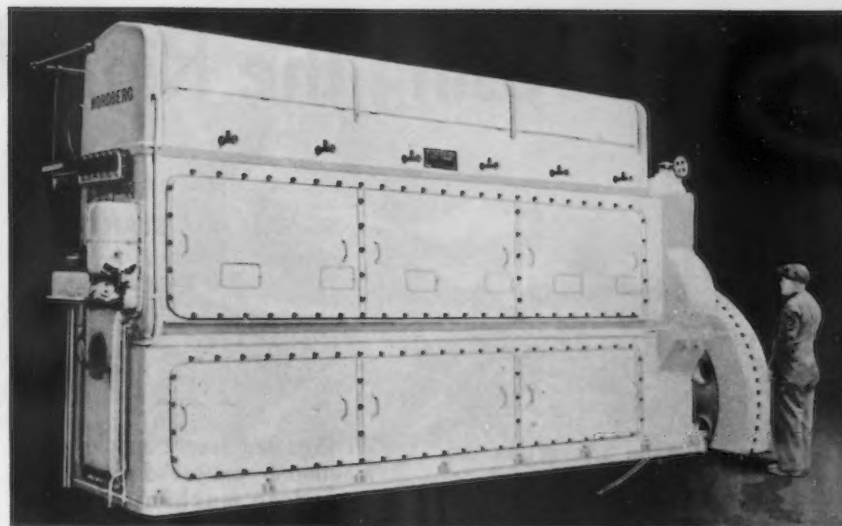
lubricating oil costs of operation to less than 33 cents per ton of ice.

"The World's Most Efficient Power Plant"

At the Atlantic Wire Co. plant, Bradford, Conn., the addition of two 200 hp. Diesels to the existing steam plant as heat balance units, saved \$5,000 a year. And at the Luling, Tex., plant of the Magnolia Petroleum Co. there is what has been widely heralded as the "world's most efficient power plant" . . . an installation of 4200 hp. of Diesel engines, which for the past year have generated power at a total production cost of 5.86 mills per kw. hr.

Center Market, Newark, N. J., a 3-story building 150 ft. x 610 ft., changed over from a steam plant with two 250 kva. and one 125 kva. alternators which had been producing power at less than utility rates, to two new 170 kva. alternators driven by 200 hp. Diesel engines. The capacity service factor of plant operation is 75 per cent; operation being 24 hours a day at an operating load of 41 per cent. Operating cost has been cut almost \$3,000 per month.

Certainly, if small Diesel-electric industrial and municipal plants can consistently show costs of from 1 to



A MODERN, fully inclosed six cylinder, four cycle, 750 hp. Diesel engine showing the influence of automotive design in its trim, clean-cut appearance, with all moving parts protected against dust.

2c. per kw. hr., large public utilities with their exceptional facilities for utilizing every possible ounce of potential energy in the fuel consumed should be able to make and sell current in wholesale quantities at considerably lower figures. That the majority of central stations are not doing

so, and that an approaching shortage of capacity will certainly not be an inducement for them to lower their prices now, furnishes at one and the same time the very best of reasons why the purchaser of power should give immediate consideration to the problem of the private power plant.

Coke-Fired Reheating Furnace

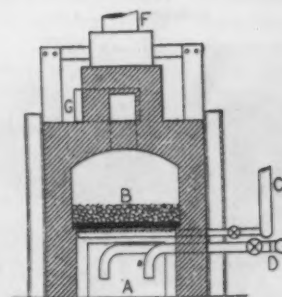
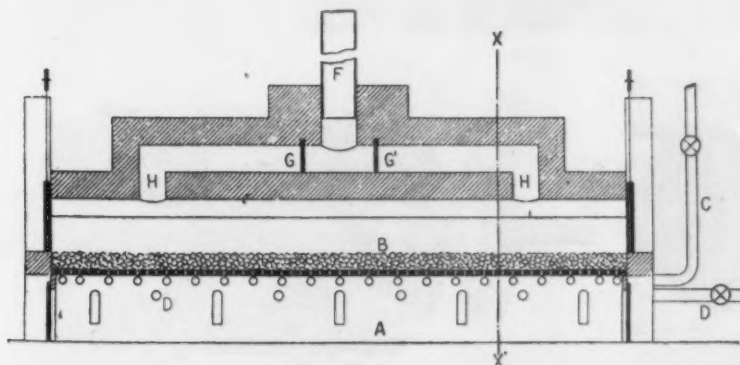
IN reheating certain classes of steel for further rolling, it is desirable that the furnace atmosphere be reducing, thereby to minimize the formation of scale, and that the furnace bottom should remain hot. A coke-fired reheating furnace to meet these requirements was described in a paper presented at the September meeting of the (British) Iron and Steel Institute by F. Lloyd and Dr. R. V. Wheeler, Sheffield. Their experiments began with a gas-fired furnace. This had a granular bed, formed of firebrick, through which a

mixture of gas and air could be fed. Later they resorted to a bed of broken and sized metallurgical coke and the gas was used only when starting up the furnace. The following has been extracted from their paper:

For the earlier experiments a bar furnace was reconstructed. It had a combustion space $16\frac{1}{2} \times 3$ ft. with an arched roof $1\frac{1}{2}$ ft. high at the center and just over 1 ft. at the sides. The furnace was designed to receive coal gas through a bed of refractory material. The gas supply was delivered through a 6-in. main (C, in the ac-

companying drawing), to 21 parallel pipes of heat-resisting steel, 6 in. apart, passing across the furnace, each having 32 holes $\frac{1}{8}$ in. in diameter, arranged in two rows along its length. The delivery of gas to each pipe could be regulated separately, and the whole supply could be controlled by a main valve.

The grate, upon which the furnace bed was formed, was completed by iron bars, of $1\frac{1}{2}$ -in. section, placed between and slightly above the gas pipes. An ash pit, A, below the grate (Concluded on Page 74)



Instead of a granular bed of firebrick, broken coke forms the bed and gas fuel is used only for starting.

Choosing the Right Drive—4

By WILLIAM STANIAR

Mechanical Transmission Engineer,
E. I. Dupont de Nemours & Co.

IN production shop driving the use of independent variable speed devices is limited because speed variation generally is accomplished by gear mechanisms contained within the machinery. In process plant operations, variation of speed must be accomplished by units outside of the driven equipment. Methods both electrical and mechanical are available for this purpose, each possessing definite characteristics and therefore definite applications. Variable speed driving of industrial apparatus may be classified into two general demands, namely, definite set speeds and indefinite variation of speeds. The most efficient and practicable devices for the former are the variable speed motors, and for the latter the variable speed mechanical unit. Where only alternating current is available there are three types of motors on the market for this class of service, one having two or more definite speeds with constant frequency, another having several speeds which vary considerably with changes in load, while still another corresponds somewhat to a direct current, shunt wound motor, is capable of an infinite number of speeds, made possible by a mechanical

THIS is the fourth article in the author's comprehensive series on modern mechanical power transmission. Previous chapters covered an introductory analyses of flexible and rigid driving systems, group shafting and direct chain drives, multiple V-rope and pivoted motor short center drives.*

*The Iron Age, July 20, p. 12; Aug. 17, p. 10; Sept. 21, p. 8.

shifting of its brushes. However, the ratio range of this type of motor is limited to 3:1 and there is a drop in efficiency and power factor rating as the speed decreases. For the indefinite speed variation requirements the mechanical devices offer a broader scope of ratio range with infinite speed variations within their ratio limits. They can be driven direct,

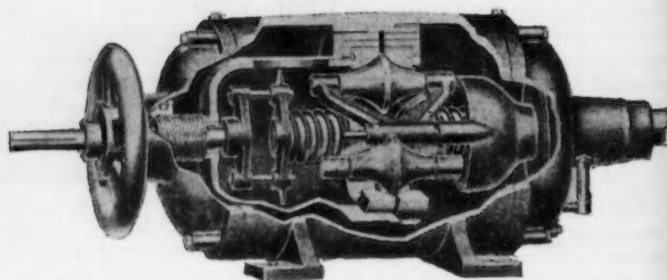
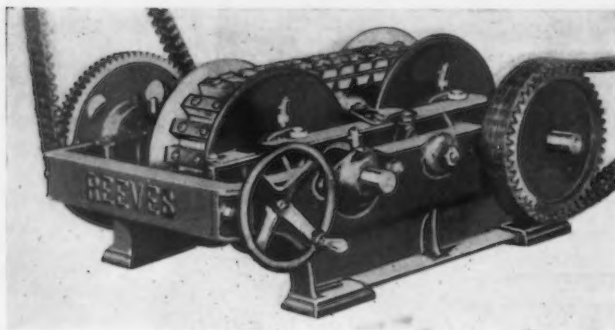
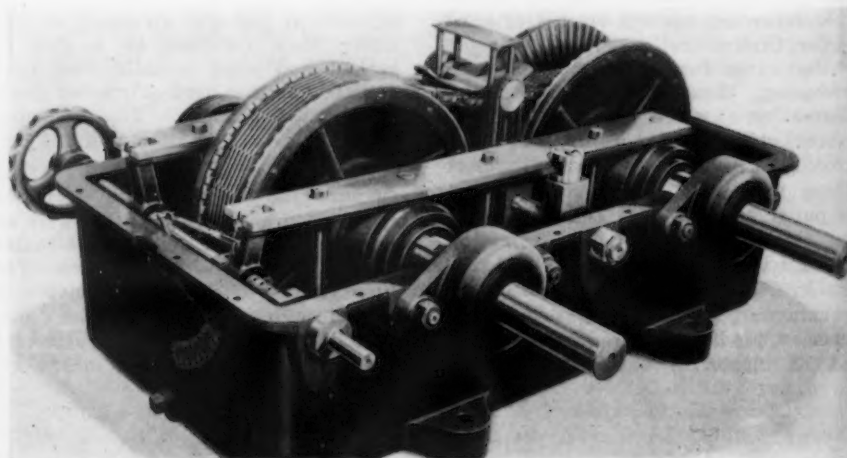
either integrally or flexible coupled by constant speed open, enclosed or explosion proof type motors with the speed variation control either local or remote.

There are a number of mechanical speed variation units available, because the demand for infinite speed change has created a fertile field for invention. Some have proven practicable and others impracticable; therefore the types most universally employed will be discussed. Choice of the various practicable units available depends to a great extent on their respective ratio range, power capacities and their adaptability to the service requirements. The machine shown by Fig. 21 employs a specially constructed flat beveled edge belt operating on fixed and movable conical disks, manufactured either open or enclosed and possesses a ratio range of 16:1 with power capacities up to

Fig. 21. Conical disks (lower left) in combination with a bevel-edged belt form the principle of construction of this familiar mechanism.

Fig. 22. A chain of special construction (upper right) operates upon fixed and moveable conical disks.

Fig. 23. Planetary conical rollers (lower right) operating with fixed and moveable conical rings are embodied in this combination variable unit and reducer.



The Variable Speed Units



150 hp. This type can be operated in either a vertical or horizontal position and can be inverted if necessary. The unit shown by Fig. 22 employs a chain of special construction operating on fixed and movable radial toothed conical disks, manufactured enclosed only, because of the necessity of splash lubrication. This device at the present time possesses a maximum ratio range of 6:1, a maximum horsepower capacity of 10 and can be operated in a horizontal position only. The chain of this variable is unique, in that it consists of a series of overlapping steel leaves or links with joints consisting of hardened steel pins turning in segmental bushings, there being no teeth on the inner surface of the chain. Instead what may be termed teeth are made of packs of hardened steel laminations or slats which extend through the links at right angles to them and project slightly at each side of the chain. The individual containers which hold the packs of slats are secured in the openings of the links, but within each such container the slats are free to slide from side to side individually with relation to each other, and adjust themselves to engagement with the radial teeth of the disks over substantially the full range of di-

ameters. The angle of the slat ends, 30 deg., is the same as that of the conical faces of the disks. Each pair of disks become an adjustable diameter wheel in the transmission of power. It can be readily observed that a mechanism of this character must be entirely enclosed in an oil-retaining casing because of the necessity of it operating in a fluid lubricant.

The machine shown in section by Fig. 23 employs conical rollers arranged in a planetary manner operating against fixed and movable conical rings, and is manufactured entirely en-

closed because of the necessity of continuous splash lubrication. This device is capable of performing two distinct functions, embodying the purpose of both a variable speed transmission and a speed-reducing unit. Two general types are manufactured, one having a maximum reduction ratio of 8:1 and the other of 40:1, each machine having a speed variation range of approximately 5:1, with a maximum horsepower rating of 18 for both types. With a definite input speed the horsepower rating is dependent on the speed of the variable shaft. The 40:1 ratio capacity of this

Fig. 25 (at right). Unit shown in Fig. 23 as arranged with integral motor.

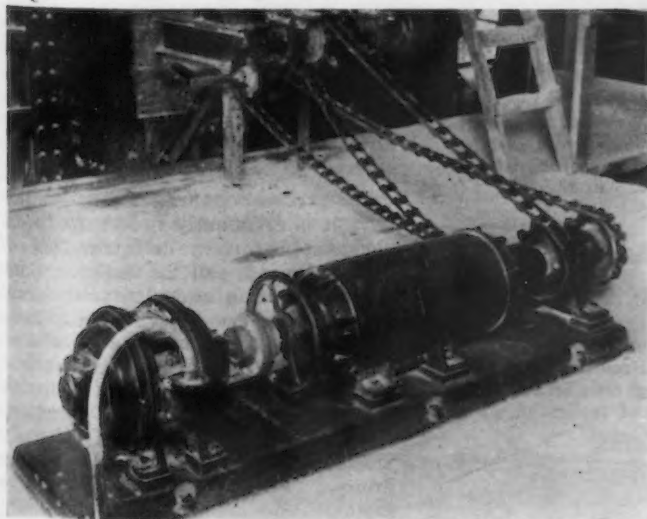
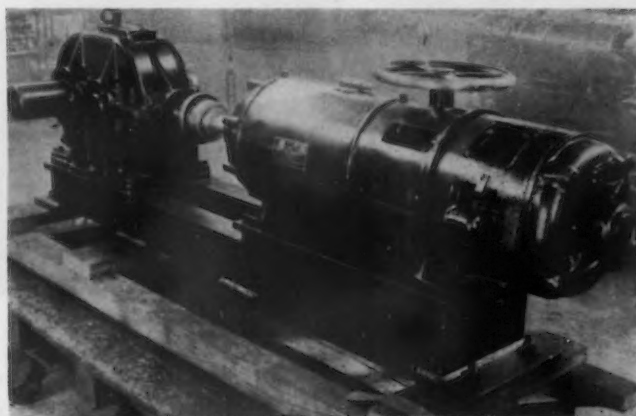


Fig. 24 (at left). Unit shown in Fig. 23 as arranged for flexible connection to motor.

device is accomplished by incorporating a 5:1 planetary gear reduction unit in the same casing with the variable speed mechanism which in operation is driven by the variable speed shaft. This machine operates with an efficiency of 95 per cent, and can be operated in either a horizontal or inverted position, with the motor direct flexible coupled, as shown by Fig. 24, or with the motor integral with the unit, as illustrated by Fig. 25. The possibility of mounting the motor integrally with a device of this character is a valuable feature because of space conservation and the elimination of couplings and base plates. This device can also be employed as a speed increaser, accom-

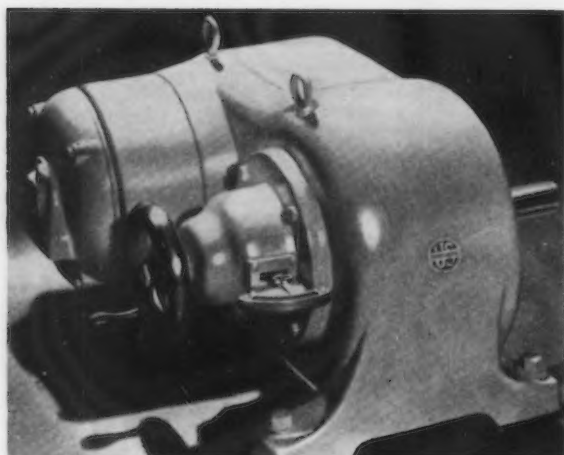


FIG. 26. Reciprocally expanding and contracting disks (at left) are embodied in this infinitely variable speed unit.



FIG. 27. Adhesion between moveable rollers and fixed disks is the principle employed in this unit (at right.)

plished by driving the variable speed shaft and coupling the load to the usual input or high-speed shaft.

Another infinitely variable speed machine with motor integrally mounted is shown by Fig. 26. This device is entirely enclosed for protection purposes and employs dual or differential disks coupled with a specially constructed belt. These disks reciprocally expand and contract for higher or lower speeds, transmitting power through the belt to the variable speed

take-off shaft. It is manufactured in ratio ranges from 2:1 to 7:1 and with power ratings up to 30 hp.

A positive infinitely variable speed machine with motor integrally mounted is shown in illustration by Fig. 27. This unit utilizes the principle of adhesion between moveable rollers and fixed disks, the variation in speed being governed by the diametral position of the rollers on the disks. It is manufactured entirely enclosed, operates in a fluid lubricant, has a

basic ratio range of 3:1 and power ratings from 2 to 20 hp.

All of the above-described variable speed mechanisms are capable of providing an infinite number of speeds between pre-determined high and low limits, which through their principles of operation permits speed graduation to the smallest fraction of a revolution. The entire range from maximum to minimum is covered smoothly and without the necessity of stopping either prime mover or

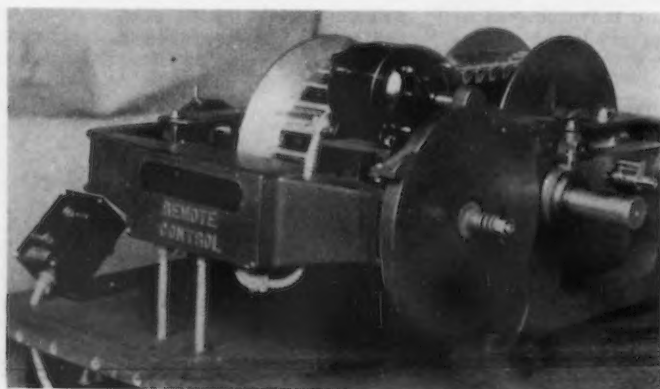


FIG. 28. Remote control (upper left), through the application of push button switches, may be applied when conditions make it desirable.

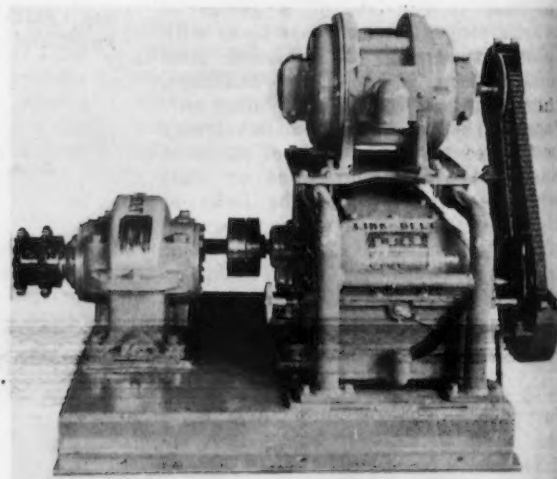


FIG. 29. Variable speed unit (at left) of the chain principle with motor driving unit through chain.



FIG. 30. A self-contained unit (upper right) with high ratio between power source and application.

driven equipment. All of these designs may be termed positive for the average demand, but when absolute accuracy of velocity ratio must be maintained the chain, planetary cone and adhesion types should be considered.

In process manufacturing industries it is frequently necessary to experiment before a determination of correct speed can be made. Such experimentation under certain chemical reactions or driving conditions must be in fractions of a revolution and without stoppage to the machinery. There are also instances during chemical manufacturing reactions where speeds must be fractionally altered without interruption to the process. For this class of service the mechanical variable speed mechan-

isms should be employed. The special fractional speed variation motor previously mentioned can be considered within its ratio limits of 3:1, if the cost can be justified. Choice between the units described must be based on space limitations, power and ratio range, location and whether the velocity of speed change must be absolutely positive. If it is feasible to control the speed variation locally the regular type of either machine can be employed, but in cases where such variation must be controlled from a distant point the units may be equipped electrically with what is termed "remote control" as shown on one unit by Fig. 28. This is accomplished by the installation of a push button at the desired point, which in turn controls a small motor mounted integrally with the variable speed machine. All types of machines may have their constant speed shafts driven by motors either mounted integrally or separately. Fig. 29 illus-



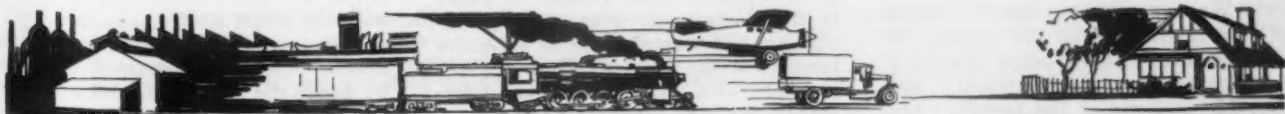
FIG. 32. Motorized change gear units give variations by distinct steps and have important fields of application.

trates the "chain" machine silent chain connected to a motor and assembled as one unit, while Fig. 30 illustrates the adaptability of the "chain machine" to a self-contained power unit where minute speed variation in combination with high ratio is required. The possibility of vertical or inverted installation is frequently an advantage because such positions are adaptable to many process plant operations. A typical installation of this arrangement is shown by Fig. 31. It will be noted that the driving motor is direct geared to the constant speed shaft of the unit and the variable shaft is silent chain connected to the driven apparatus. The small motor attached to the frame of the variable speed unit controls the movement of the cone disks and is operated electrically from some remote point. There are occasions in

Production Shop and Process Manufacturing Plant Driving

METHOD	Fractional Indefinite Speed Variations		Definite Speed Change	
EQUIPMENT AVAILABLE	Wedge-shaped belt conical disc machine Chain belt radial toothed conical disc machine. Planetary cone machine. Integrally mounted motor belt and disc machine. Roller and disc adhesion type machine. Special variable speed shifting brush motor.		Variable speed motors 1 to 4 speed change gear units	
SERVICE	Wedge-shaped Belt Machine	For speed determined by experimentation. For speed change without interruption to motion. For infinite speed variation where 100 per cent velocity ratio is not essential.	Standard variable speed motor.	For 1 to 4 predetermined speeds. Where electric control is preferable.
	Chain Belt Machine	For speed determination by experimentation. For speed change without interruption to motion. For infinite speed variation where 100 per cent velocity ratio is essential. Where space is a factor.	Change gear units.	For 1 to 4 predetermined speeds. Where manual control is possible and desirable. Where expense must be considered.
	Planetary Cone Machine	For speed determination by experimentation. For speed change without interruption to motion. For infinite speed variation where 100 per cent velocity is essential. Where the combination of variable speed and velocity reduction is desirable. Where an integrally mounted motor is essential. Where space is a factor.		
	Integrally Mounted Motor Belt and Disc Machine	For speed determination by experimentation. For speed change without interruption to motion. For infinite speed variation where 100 per cent velocity ratio is not essential. Where an integrally mounted motor is essential. Where space is a factor.		
	Roller and Disc Adhesion Type Machine	For speed determination by experimentation. For speed change without interruption to motion. For infinite speed variation where 100 per cent velocity ratio is essential. Where space is a factor.		
	Special Shifting Brush Motor	For speed change without interruption to motion. For infinite speed variation. Where electrical control is desirable.		

Variation range of mechanical units	Wedge Belt Disc Machine	Chain Belt Machine	Planetary Cone Machine	Integrally Mounted Motor Belt and Disc Machine	Roller and Disc Adhesion Type Machine
	2:1 to 16:1	1:1 to 6:1	2:1 to 5:1	2:1 to 7:1	1:1 to 3:1
Horsepower Capacities	1/2 to 150	1/2 to 10	1/2 to 18	1/2 to 30	2 to 20
Lubrication	Fluid lubricant for bearings and working parts	Entire mechanism operates in a fluid lubricant	Entire mechanism operates in a fluid lubricant	Fluid lubricant for bearings and working parts	Entire mechanism operates in a fluid lubricant
Installation position	Horizontal Vertical Inverted	Horizontal only	Horizontal Inverted	Horizontal Vertical Inverted	Horizontal Vertical Inverted
Control	Hand or electric Local or remote	Hand or electric Local or remote	Hand or electric Local or remote	Hand or electric Local or remote	Hand or electric Local or remote





both production and process plants where from 1 to 4 definite speeds must be available during the course of an operation or a reaction. For this class of work one of the standard types of variable speed motor or the motorized change gear unit, as illustrated by Fig. 32, can be employed. Choice to a great extent may be determined on a basis of first cost, space limitations and ease of control. Ease of control is probably the most important, because the change gear is a combination of electric and mechanical controls, whereas the variable speed motor control is electric only.

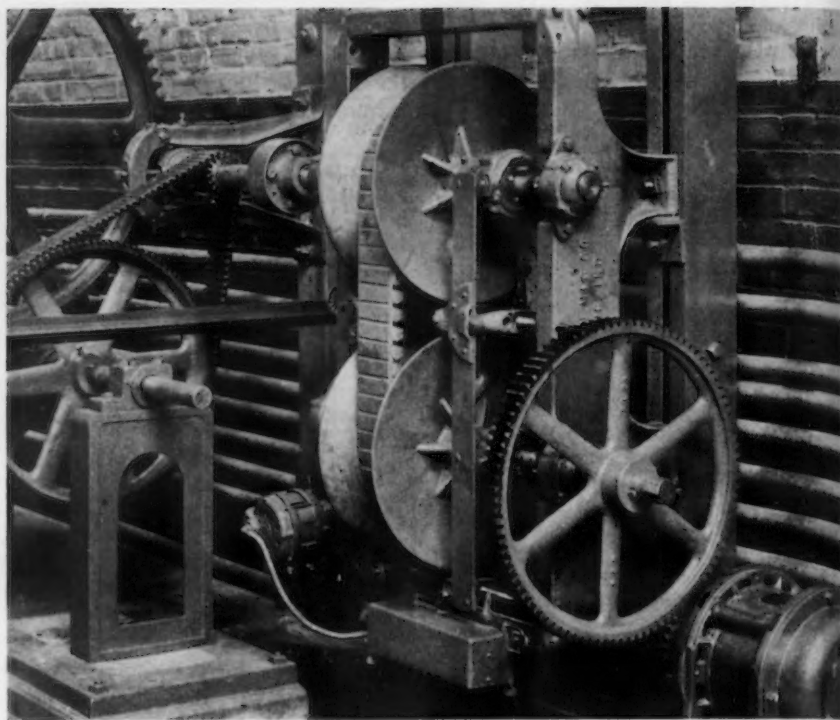


FIG. 31. Vertical installations frequently offer a distinct operating advantage in the application of variable speed units

Forging Furnace of Walking-Beam Type

A FORGING furnace of the walking beam-type with a refractory progressive hearth, and including water seals and siphon vents, has been brought out by the Gas Machinery Co., Cleveland. Refractory-lined conveyor beams are used instead of heat-resisting alloy beams in the work conveyor. The furnace is designed to produce high-quality forgings by progressive, uniform heating, with minimum scale and surface decarburization. The furnace may be used to heat steel to the higher temperatures required for forging, cogging and rolling, as temperatures are not subject to the restriction of alloy parts.

Walking-beam furnaces with refractory-lined conveyor beams previously have been built. The Gas Machinery design aims particularly, however, to prevent scaling, decarburization and infiltration of air into the heating chamber. The use of water seals and siphon vents was applied first by this company to a rotary forging furnace described in *THE IRON AGE*, June 23, 1932. Water seals extending the length of the furnace make for a positive seal in the walking-beam conveyor furnace between the stationary and movable sections of the hearth. The

inflow of air through the bottom of the heating chamber is prevented.

Water vapors from the seals instead of entering the heating chamber are carried away through siphon vents. These are connected to manifolds which extend parallel to and are located directly above the water seals. Suction on these siphon manifolds is maintained by the passage of the waste gases through the waste gas flues. Each waste gas flue is extended to connect to the siphon manifold and is provided with a refractory damper which is permanently adjusted after the furnace has been thoroughly dried out. The suction in manifolds is found to be sufficiently strong to withdraw any water vapors and is controlled by dampers to prevent pulling an excessive amount of hot gases down from the heating chamber when the burners are on "high fire." The operation of the furnace serves to keep the hearth under absolute atmospheric control.

Water is supplied to the troughs at the unloading end of the furnace and discharged through a visible overflow at the opposite end. Volume of water is thermostatically controlled to insure against wasteful use or excessive temperatures. This circulating water also provides cooling for the understructure of the furnace and hearth.

When burners are on "high fire," there is usually sufficient pressure in the heating chamber to prevent any influx of outside air into the furnace through door openings. However, when by the action of the automatic temperature control, the burners are changed over to "low fire," and the temperature in the heating chamber immediately starts to drop, there is a contraction of the hot gases within the heating chamber. This in addition to a drop in the volume of gases introduced by the burners, tends to cause a flow of outside air through the doors.

To prevent this inleakage, siphon vents are also provided over the door openings. In this construction the vertical waste gas flues are extended downward through the lintels over the door openings and side ports, for entrance of the waste gases from the furnace are located considerably above the door lintels. The suction created in the bottom section of the waste gas flues causes outside air to be drawn into the siphon vent flues and to be discharged to the atmosphere along with the waste gases.

The progressive walking beam is driven either by mechanical means or by hydraulic cylinders, and all movements are automatically controlled

and interlocked to produce a practically continuous movement through the complete cycle. Its movement is indicated on the drawing. The No. 1 movement raises the hearth and furnace charge; No. 2 carries the hearth forward a predetermined distance; No. 3 lowers the hearth and replaces the charge upon the stationary refractory support; No. 4 returns the hearth to its original position. The vertical movements Nos. 1 and 3 are equal and constant and movements Nos. 2 and 4 are equal and variable.

The furnace is charged either by hand or mechanically on a section of the hearth extending outside the charging end. Billets are placed on the hearth with space between to expose the side walls to radiant heat, thus giving, it is pointed out, three times the surface area that is obtained in pusher type furnaces. This exposed surface is augmented on the under side because the product is alternately supported by the stationary refractory hearth from the ends and the progressive refractory hearth from the central section during its travel through the furnace. These factors, it is found, tend to reduce both the time and temperature required to bring the product to a forging heat.

The seals preventing infiltration of outside atmosphere help to insure efficiency of fuel use and control of the furnace atmosphere, meanwhile reducing to a minimum the amount of scale formed during the heating operation. Other features of the furnace emphasized by the maker are:



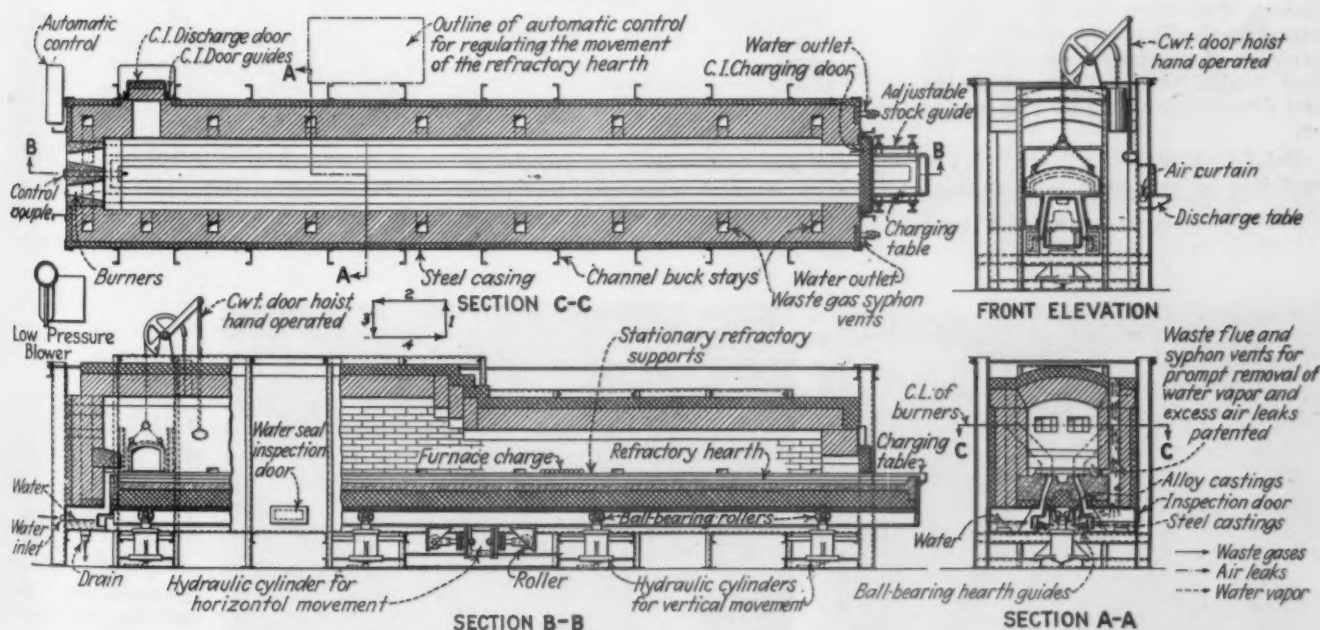
The furnace may be divided into three zones for preheating, heating and soaking, each with individual temperature control. Sticking is avoided as the billets go through the furnace without being in direct contact with each other. In case of extended interruptions of the forging operations the conveyor hearth may be reversed and the product backed to the preheating zone and loading table. Life of refractories is prolonged and formation of slag reduced by the lower furnace temperatures.

Billets may be removed from the furnace at an intermediate point after being partly heated. They may be automatically unloaded from furnace to hammer. The furnace may be emptied of the billets at the end of the shift without the necessity of pushing through dummies, as the loading process may be stopped in time to insure discharge of the final billet as the shift ends. Production per square foot of hearth area is increased because of the increased exposed area of the product. The operating mechanism of the hearth is accessible and its automatic control permits wide range in the time required for passing the product through the furnace. The entire hearth may be withdrawn from one end of the furnace on

rollers mounted on horses to facilitate repairs or replacement of the lining of the furnace or hearth. Burners are located sufficiently high above the stock to insure thorough combustion of the heating gases before making contact with the stock.

Automatic temperature control together with placement of the burners and waste gas vents permits correct distribution of heat. The control couple is located to record the temperature of the product just prior to its discharge. The control equipment is adjusted under operating conditions with Orsat analysis for CO_2 , O_2 and CO . Stock is not subject to cold spots due to infiltration of air, as through openings in the hearth. The flow of heating gases is counterwise to the direction of travel of the stock.

Some twenty millions of dollars are wasted annually in the United States in the futile attempt to qualify the indolent and incompetent for an education along engineering lines, according to an investigation conducted under the auspices of the American Association of Engineers. It has issued a book entitled "Vocational Guidance in Engineering Lines," a volume of some 550 pages, for sale at \$2.50 by the Mack Printing Co., Easton, Pa. The editorial committee which supervised the publication is headed by Dr. J. A. L. Waddell, New York. One of the objects is to prevent a great number of young men from making failures of their lives and to improve materially in a few years' time the quality and efficiency of the men in the graduating classes of engineering.



THE movement of the hearth is automatically controlled and interlocked to produce a continuous motion through a complete cycle. The motions are indicated on the diagram a little to the left of the center of the drawings. The No. 1 movement raises the refractory hearth and furnace charge. No. 2 carries the furnace charge and the refractory hearth horizontally through a predetermined distance. No. 3 lowers the hearth and replaces the furnace charge on the stationary refractory supports. No. 4 returns the hearth to the original position

Development of Cast Iron for Machine

IN no phase of metallurgical endeavor has progress been more marked during the past decade than in the field commonly known as gray cast iron. Notwithstanding this, it has suffered attacks from every angle for years and even up to the present it is regarded by many as a hybrid material lacking reliable properties. This is not difficult to understand when we consider that there is no satisfactory definition for gray cast iron, nor for that matter any comprehensive specifications. Gray cast iron, including semi-steel (which is nothing more than cast iron melted with varying proportions of steel), is not one simple thing but a family of iron, carbon, silicon alloys containing 2 to 4.3 per cent carbon, 0.4 per cent and upward of silicon in combination with manganese, sulfur, phosphorus and, maybe, nickel, chromium, molybdenum and vanadium.

This matter is complicated further by the fact that these chemical elements form structural compounds which govern the physical properties of any casting. The presence and form of these structural compounds are further influenced by the thermal history of the iron, i. e., the temperature and conditions of melting, temperature of pouring, temperature and heat conductivity of the mold, design and dimensions of the casting and so on.

Briefly, a structural analysis of cast iron or semi-steel may contain:

2 to 56 per cent of ferrite (soft iron) (Fe)

HERE is an outline of what constitutes cast iron from the standpoint of chemical, structural and physical properties, contributed to a Chicago meeting of the American Society of Mechanical Engineers. Developments, as they affect the engineer, are traced to the latest advance signaled by the adoption of A.S.T.M. Specification A48-32T for Gray Iron Castings. Test methods and effect of mass on physical properties in the light of these specifications are touched on and the designer is shown how cast iron may be adapted to varied fields of application, and not be regarded as a hybrid material lacking reliable properties.

2 to 10 per cent of iron silicide (FeSi)
0 to 85 per cent pearlite (lamellar FeC_3 in Fe)
0 to 43 per cent cementite (iron carbide) (FeC_3)
0.48 to 14.95 per cent phosphorus eutectic (see Table I)
0.09 to 0.67 per cent manganese sulphide (MnS)
0.06 to 0.21 per cent iron sulphide (FeS)
0 to 10.7 per cent graphite (C)
while its specific gravity may vary from 7.06 to 7.66.

The nature and physical properties of these compounds are given in Table I. Exact structural volume analyses of four different irons together with

their resulting mechanical properties are given in Table II. These structural analyses list in tabular form the constituents which the metallurgist looks for in photomicrographs.

Remembering the physical properties given in Table I, contrasts may easily be illustrated by noting the large proportion of hard, brittle, cementite in white iron (42.67 per cent) as compared with the other three irons, which contain none of this constituent, but in its stead soft ferrite and graphite in various proportions, both of which are favorable to machinability. Further, the cylinder iron would be weaker and less tough than the high-test iron because of its smaller proportion of pearlite (72.84 per cent compared with 84.59). The photomicrographs (Fig. 1) give a composite picture of these isolated facts and the distribution which the various structural materials take.

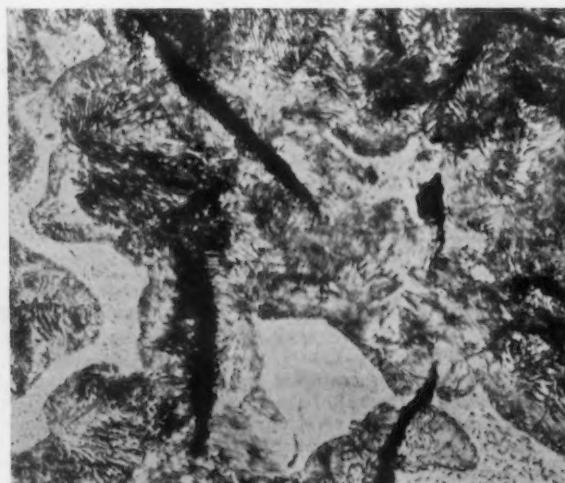
These few variables just noted may be augmented still more on further perusal of this table and it is easily seen why one cast iron may be radically different from another and how the mechanical properties of any casting are governed by the nature and crystalline form of its constituents. This leads to a better understanding of the founder's problem of testing gray iron and of establishing specifications.

Classification

The recent tentative specification of the American Society for Testing Materials, A48-32T, places gray iron into



A



B

FIG. 1. Photomicrographs of four cast irons, all at 100 diameters

(a) High-test iron, showing lamellar pearlite structure

(b) Automobile cylinder, showing favorable graphite distribution in pearlitic-ferritic matrix

Machine Construction

By OLIVER SMALLEY
Technical Director, and
W. W. KERLIN,
Metallurgist, Gray Iron Institute

seven classes based on tensile strength, listed as follows:

Class	Minimum Tensile, Lb. Per Sq. In.
20	20,000
25	25,000
30	30,000
35	35,000
40	40,000
50	50,000
60	60,000

Three sizes of test bars are included to provide adequate design information pertaining to various section ranges of castings, thus:

Test Bar Designation	As-Cast Dia. of Bar	Controlling Section of Casting
A	0.875 in.	up to $\frac{3}{4}$ in.
B	1.2 in.	0.76 in. to 1.1 in.
C	2.0 in.	1.11 in. to 2.0 in.

Tensile Strength

If a test larger than 2 in. sections is required it is proposed to cast a bar bearing a direct relationship to the average dimension of the casting.

Fig. 2 shows the relationship between strength and section size. Effect of mass is illustrated by the ratio: surface \div volume of the bars tested. In all of these tests as much of the as-cast area was preserved as possible—by only machining away 16 to 18 per cent of the cross-section in making the test bar—so that this test would be representative of a section having normal machine work done upon it. These curves illustrate the properties of irons falling in class numbers 50, 40, 30, and 20. Here it will be observed that class 50 irons hold their strength well in both

TABLE I—Physical Properties of Cast Iron Structural Compounds						
	Specific Gravity	Tensile Strength Lb. per Sq. in.	Ductility Per Cent	Brinell	Physical Condition in the Casting	
Ferrite	7.86	49,000	40.0	95.	Iron	
Iron silicide (Fe Si)...	6.17	low	none	...	1% silicon forms 3% iron silicide which is a solid solution of iron silicide	
Pearlite	7.846	125,000	15.0	240.	A laminated structure containing 6½ parts soft iron to 1 part cementite.	
Cementite	7.66	5,000	none	550.	A compound of iron and carbon containing 6.67 per cent of carbon.	
Phosphide eutectic	7.34	none	brittle	...	61 per cent phosphide of iron (Fe ₃ P), 39 per cent saturated solution of Fe ₃ P in iron. This substance is 9.8 times that of the P content by weight.	
Manganese sulphide ..	4.00	none	brittle	...	1.73 parts manganese to 1 part sulphur.	
Iron sulphide	5.02	low	brittle	...	1 part iron to 1.16 parts sulphur.	
Graphite	2.255	none	brittle	...	Impure carbon, 1 per cent by weight represents 3.25 per cent by volume.	

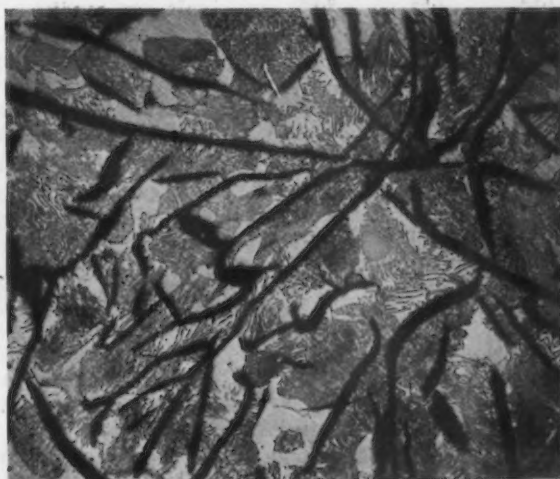
light and heavy sections while the class 20 irons show a more rapid drop in strength. This latter is in agree-

ment with the general conception of mass influence.

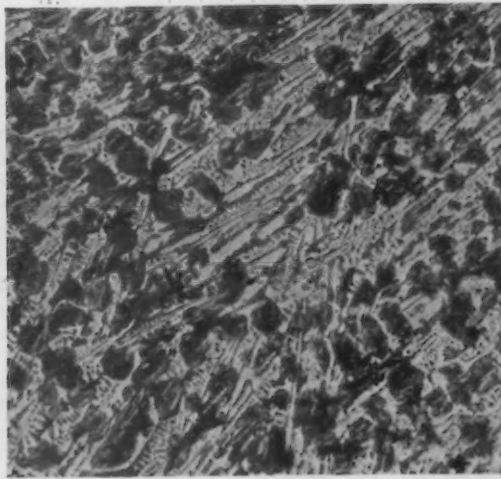
The transverse test bar is the most

(c) Gear iron, showing a variation in graphite, pearlite and ferrite distribution

(d) White iron, showing hard cementite needles and pearlite distribution



C



D

commonly used but least understood. Transverse strength depends on the variable strength and brittleness of the metal at different points across the section, and upon the distribution of stress which is not so simple as the theory of beams suggests. In the past few years it has passed into more of a foundry control test than a test from which fundamental strength values can be derived.

Transverse tests have been included in this new specification because of its long association with gray cast iron, and its low cost. To date it is recognized that there is no relationship between tensile and transverse strength but it is hoped that it will be possible to establish a separate relationship between transverse and tensile properties of each of these new classes of irons. If this can be done, this simple and inexpensive test will become truly worth while.

Fig. 3 represents an attempt to interpret transverse strength and total deflections in terms of toughness. In plotting these curves some 1000 test bars, 1.2 in. diameter, were broken, representing some 12 types of gray iron from 48 different foundries. Some of these irons were known to be eminently suited for purposes where severe service conditions were encountered, others were known to be weak and brittle and unfit for anything other than common structural castings. This chart affords a rough guide differentiating gray irons of varying degrees of brittleness and might conceivably enter a specification which requires iron of superior toughness.

Factors Affecting Design

In the early days of engineering, quality of material was not the vital

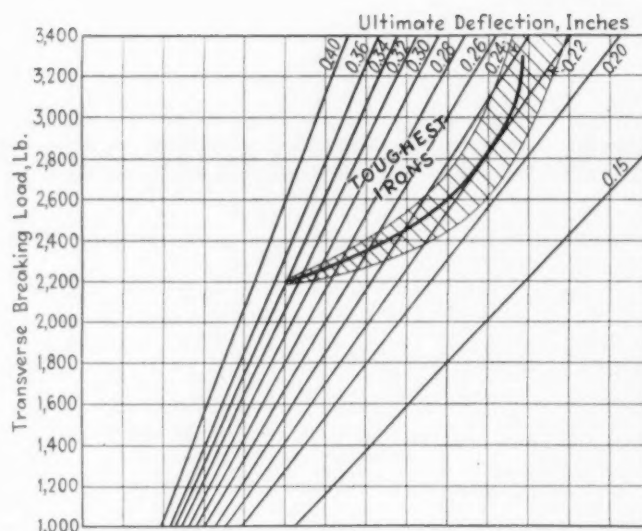


FIG. 3. Relationship between transverse strength and deflection on 1.2 in. diameter by 18 in. transverse bars



issue that it is today and, as conditions have become more severe, cast iron appears, for obvious reasons, to have given way to new materials. Factors in design can now be considered in the light of the new properties available. Some of these properties are compressive and fatigue strength, rigidity, impact, wear, hardness, corrosion resistance, heat resistance, magnetic properties and others.

COMPRESSION—This is a test for intrinsic strength as opposed to soundness. Usually the compression strength is 4 to 5 times the tensile.

FATIGUE—This property depends upon the crackless plasticity of the gray iron structure. The endurance ratio varies from 42 to 47 per cent of the tensile strength.

RIGIDITY—This property is determined by the damping vibration test. The characteristic curve for

cast iron, representing amplitude vs. number of vibrations in an oscillating piece, is 2½ in. long as against one 30 in. long for steel and 54 in. long for aluminum.

WEAR—This is primarily a function of the matrix, or microstructure, and the quantity of free carbon. Cast iron is unique in that it combines self lubricating and hard wearing properties.

HARDNESS—This is controlled within certain limits by method of manufacture, composition and rate of solidification. All degrees of hardness are possible by heat treatment.

CORROSION—Special corrosion resisting properties may be conferred by paying close attention to the method of manufacture and additions of alloys.

HEAT RESISTANCE—Performance is dependent upon severity of service conditions. Irons are available which will resist the various strains, corrosive gaseous and decomposing action maintained in service. Cast iron retains its strength at temperatures up to 800 deg. F.

MACHINABILITY—Ranges are wide and cast iron may be made to suit any condition, remembering that ease of machining is inversely proportional to the strength and toughness of the casting. Effect of chilling, treatment by special alloys, heat treating and special methods of manufacture may modify this statement.

MAGNETIC PROPERTIES—Cast iron lends itself to uses where high permeability, permanent magnetism or non-magnetic properties are desired. These cannot be combined in one iron.

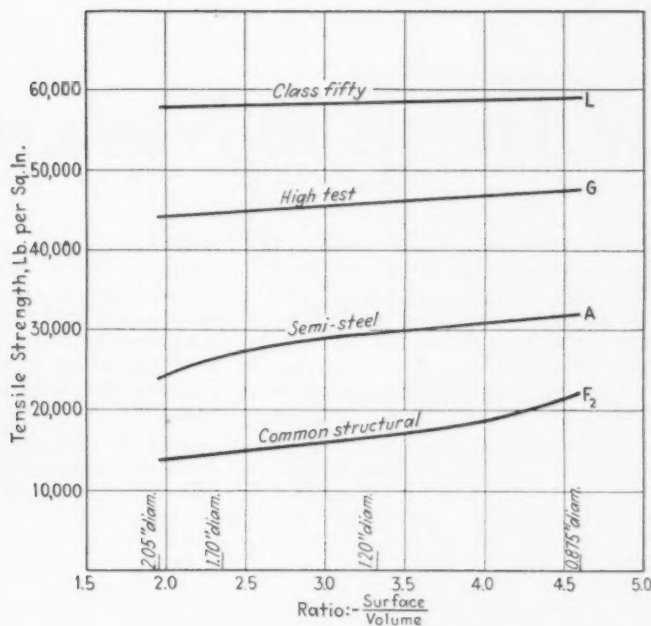
HEAT TREATMENT—Cast iron yields to heat treatment, such as hardening and tempering, nitriding, annealing to remove casting strains or to soften for improved machinability.

MASS EFFECT—Mechanical properties—tensile, compression, fa-

TABLE II—Chemical and Structural Volume Analyses of Four Cast Irons

	High Test	Auto Cylinder	Gears	White Iron Castings
CHEMICAL ANALYSIS:				
Graphite, per cent.....	2.10	2.50	2.50	...
Combined carbon, per cent.....	0.80	0.70	0.72	3.30
Silicon, per cent.....	1.10	1.80	1.50	0.60
Manganese, per cent.....	0.75	0.80	0.90	0.52
Phosphorus, per cent.....	0.20	0.32	0.30	0.50
Sulphur, per cent.....	0.07	0.10	0.11	0.15
Iron, per cent.....	94.98	93.78	93.97	94.93
STRUCTURAL ANALYSIS BY VOLUME:				
Iron silicide, per cent.....	3.91	6.30	5.26	2.23
Free ferrite, per cent.....	2.45	9.35	7.72	none
Pearlite, per cent.....	84.59	72.84	75.64	49.13
Manganese sulphide, per cent.....	0.35	0.49	0.54	0.67
Phosphide eutectic, per cent.....	2.00	3.15	2.96	5.21
Graphite, per cent.....	6.70	7.87	7.88	none
Iron sulphide, per cent.....	...	...	...	0.09
Free cementite, per cent.....	...	...	...	42.67
Calc. specific gravity.....	7.34	7.23	7.25	7.66
PHYSICAL PROPERTIES:				
Tensile str.—lb. per sq. in.....	45,000	27,000	32,000	32,000
Compressive—lb. per sq. in.....	160,000	101,000	128,000	140,000
Fatigue limit—lb. per sq. in.....	21,000	15,000	14,000	...
Brinell hardness.....	230	180	192	374

FIG. 2. Effect of mass on tensile strength of four irons entering medium heavy castings



tigue and hardness — vary continuously with section. Modern methods of testing take this variable into consideration.

A well designed casting may be said to be one that can be made commer-

cially and whose sections are no thicker than is essential to the desired unit of strength, and are evenly proportioned so as to avoid local slow cooling.

Design is usually accomplished by

the application of experimental knowledge to complicated structures by means of the laws of mechanics. Factors of safety are introduced because of the weakness of the engineering formulas, and unknowns arising from the manufacturing process and complications due to unforeseen events and conditions in service.

The experimental evidence has been presented in this paper with a view to promoting the use of A.S.T.M. specification A48-32T for gray iron castings. It is recommended that engineers and designers become familiar with these specifications so that they may use these classifications on blueprints to best advantage.

On the basis of design, greater strength and stiffness permit reduction in weight of a casting and may cause savings in machining, fitting and handling, but this reduction of weight, considered without a knowledge of foundry practice, may defeat its own end. Proper cooperation between designer, pattern shop, foundry and rate fixing department is of utmost importance. When planning an important job it is well to issue a preliminary drawing to all departments interested.

The Foreman the Factor in Safety Observance

THE foreman has more influence on safety progress than any man in a working organization, said F. M. Gillies, assistant general superintendent, Inland Steel Co., Indiana Harbor, Ind., at the recent Safety Congress in Chicago. "Look to him to do the work, to know the men, to note the regard for safety in his men and to observe the conditions that his men work under. Depend on the foreman to get results and to make certain of them. Penalize him for failure to carry this end out. Here is the best spot to put the penalty of discipline for accidents that occur under him that are caused by proved carelessness or laxness on his part. This will awaken him to his responsibilities and produce results.

"Knowing that plant management stresses the foreman's responsibilities so strenuously," continued Mr. Gillies, "has a tendency to cause the management to mollify discipline if there is a way out, but this should not be done. If the foreman is the right sort he wants to do his work as well as it can be done and if he has neglected the safety phase it should be forcibly brought to his notice."

Since the inception of the 8-hr. day in 1923, methods of selection of em-

ployees, Mr. Gillies asserts, have continued on much the same basis which was in practice for the preceding 30 years. With the restriction of immigration, which has cut down the number of acquirable so-called greenhorns, the general intelligence standard has improved, but only because the immigrant has become more used to our ways and has accumulated more general intelligence. He also has learned to speak and understand our language better each year and this again has influenced his intelligence rating. The influx of Mexican labor in some of the steel producing centers was not such a handicap because 80 per cent of these emigrés to the States can read and write their own language, which is more than immigrants from Europe could do, who came to this country in such great numbers prior to the war.

"Assuming that the intelligence rating of the average employee has advanced in the last 10 years," continued Mr. Gillies, "still employment methods permit the employing of some rather retarded mental developments, and every time such a man is hired the company acquires a risk far greater than that normally assumed with one of so-called average intelligence. Possibly a test should be required. It

would not necessarily eliminate many but would give a fair rating of common sense and at least eliminate those who were outstandingly backward, who as a class contribute greatly to the group that have accidents. Along with the mental side must be considered the physical aspect.

"The practice of rewarding departments, groups, or individuals who have been successful in completing a period of time in which satisfactory or outstanding safety records have been made, has been in practice to some extent. During the recent depression this feature has gone by the boards along with many other bonuses, etc., made necessary by strict economizing.

"However, there is merit in the plan generally, because one of the greatest fundamentals in securing unusual performance is a reward of one kind or another. Cash rewards are the best. It is impractical to attempt to distribute a nominal sum to a large group of employees, for unless extreme generosity is used, the increment to any one workman would be too small to have the desired effect and so as the best safety bet—the foremen should receive the reward."

▲ ▲ ▲ New Things in Materials and Processes

A New Carbide Cutting Tool

CARBIDE cutting tools have occupied a prominent place in the metallurgical picture in recent years. Now a new one has been announced in England. It contains neither tungsten nor tantalum but is a molybdenum-titanium carbide. Some extraordinary claims are made for it—a further advance in cutting capacity and performance, and new standards of efficient production.

Its manufacture is similar to that used for the more familiar combinations. The mixture is carburized in the powdered form, blanks are produced by pressure which are cut into the desired shape and then sintered, usually in a hydrogen flame. The new material has a lower specific gravity than the others, is claimed to generate less heat when cutting, and to resist oxidation up to 900 deg. C. Its Rockwell hardness is 83 to 85 on the 100 kg. scale.

Among some examples of its uses are the following:

1. Two complete shafts were cut from an 0.35 per cent carbon steel, 8 in. in diameter and 8 ft. 6 in. long with a feed of 0.05 in. and a cut of 3/16 in. deep, a cutting speed of 1200 ft. per min. being used. The machine used was a heavy modern express lathe with a 35-hp. motor capable of 50 per cent overload. The rate of metal removed was 135 cu. in. per min. At the end, the edge of the tool was in good condition.

2. An 80-ton cobalt magnet steel was machined as cast for 1½ hr. at a speed of 164 ft. per min. with a feed of 0.008 in. and a cut of 0.0625 in. deep before regrinding was necessary.

A claim is made that an unusually high class finish is obtained if the speed of cutting is substantially increased, using a moderately fine feed. The new material is claimed to work excellently on non-ferrous metals, particularly aluminum. It also cuts bakelite, glass, porcelain, marble, cement, ebony and so on.

Beating Nature to the Roof Patina

THERE are many who admire the soft green coating—called "patina"—which gradually collects on roofs and exposed parts of buildings sheathed with copper. It takes from 12 to 14 years for this colored surface to form. There are many cases of this in New York, the roof of the Public Library at Forty-second Street and

Fifth Avenue being a conspicuous example. Such coatings have been carefully investigated and have been found in most cases to be a basic sulphate of copper in cities—in some localities, a basic carbonate.

To satisfy the demand for quick results the Copper and Brass Research Association, of New York, made an investigation of the coating and instituted extensive experiments toward solving the problem of artificially and quickly forming this coating on copper sheets and other building forms.

The results of the research are announced as successful. Details of the process cannot be given here except to say that ammonium sulphate is used and, by special treatment, a green coating of various shades is quickly bestowed on the copper. It is a coating which retains its color and stability, it is claimed, satisfactorily imitating the patina produced by years of weathering. It is stated that attempts to produce the patina by means of acids are not generally successful.

Alloy Steel Rails

SOME 10 years ago there were produced in this country some Bessemer steel rails with a copper content of about 0.50 per cent. They were made for the Chicago, Milwaukee & St. Paul Railway Co. In the main track of several of the divisions of this road, some of these copper alloy steel rails, 90-lb. type, were laid. Reliable testimony is that these rails gave good or better service than the Bessemer rails rolled without copper.

Experiments with copper as an alloy for rail steel have been held up but in the near future these researches are to be continued. Rails containing copper and a small percentage of nickel are to be tried out. It is expected that certain advantages will be demonstrated, sufficient to recommend their serious trial in service.

Electrodeposition of Magnesium and Bismuth

THAT advances are constantly being recorded in the electrodeposition of various metals is emphasized by the publication of papers presented at the September convention of the Electrochemical Society at Chicago.

Magnesium comes into the picture in a paper by D. M. Overcast and F. C. Mathers of Indiana University. This metal, according to the authors, can be successfully electrodeposited

from solutions of complex magnesium salts, similar to the Grignard compounds, dissolved in various non-aqueous solvents. The best non-aqueous liquid for addition to this Grignard reagent is dimethylaniline. Deposits of magnesium are easily obtained on the cathodes.

Bismuth can be deposited from bismuth perchlorate solutions and the cathode deposits are smooth, says M. Harbaugh and F. C. Mathers, also of Indiana University, in a separate paper. Besides being smooth, the deposits are finely crystalline and quite free from rough edges. A use for electrolytic bismuth may be found in certain electrical or other devices.

Chromium Plating for Automobiles

IN a conversation recently with an authority on electroplating, I learned the following facts regarding the present practice of automobile manufacturers as to their use of chromium plating for trim. Only one maker is now using rustless steel to any extent, the others employing almost without exception chromium plating. But the chromium is described as merely a lacquer.

Present practice is to plate the base metal with a substantial covering of nickel to insure against rusting and to cover minor blemishes. Then on top of the nickel is placed a film of chromium plating—a mere flash. This prevents the nickel from tarnishing and bestows on the parts used for trim the beautiful bright luster which is practically impervious to rust, tarnish or dullness and gives the automobile its attractiveness.

Rhodium Plating for Reflectors

THAT rhodium as a plating metal is gaining in commercial use is not generally appreciated. It is such a rare metal that it does not come to general notice. Methods of plating rhodium have been perfected recently so that its industrial application is possible.

During the discussion of a paper on rhodium plating at a meeting of the Electrochemical Society in Montreal, Dr. Colin G. Fink mentioned that the airways between the Atlantic and the Pacific coasts are lit up at night with electric searchlights using rhodium reflectors. The reflectors in the Music Hall at Radio City, New York, are also rhodium-plated.

The cost of rhodium plate is fairly high, but on the other hand the cost is very much lower than silver because the upkeep of silver is expensive. Silver in large urban districts tarnishes and then, if one tries to clean it, the metal is easily scratched and the reflectivity is reduced.

Rhodium plate is resistant to corrosion. In the old text books rhodium was ascribed a bluish cast and yet, when electrodeposited, the bluish cast does not exist. It is nearer white than many of the other metals.

• • •

A New High Temperature Refractory

THORIUM as thorium oxide gives us a refractory for high temperatures. It is made from the nitrate of thorium. The fused thoria is prepared for making into shapes by grinding to 100 mesh and mixing with just enough thorium chloride solution to pack firmly. Suitable molds can be made of electrode graphite. The shapes may be burned in the graphite mold to 1600 deg. C. in a high-frequency induction furnace without danger of excessive carbide formation and be sintered enough to withstand handling. The parts after removal from the mold are finished by treating to 1000 deg. C. in an electric muffle furnace, re-burned at 1600 deg. C. in the high-frequency furnace, and given a final heating to 1000 deg. C. in the muffle furnace to insure complete removal of all carbide that may have been formed. The finished product is not glazed but is stated to have a fair amount of strength.

Thorium oxide shapes have numerous possibilities in the scientific laboratory. A crucible of it of special design was used for studying the positive omission of metals at high temperatures and in a vacuum.

• • •

Heat-Treating Chromium Steel Rails

SPECIAL heat treatment and equipment for steel rails containing chromium is suggested by a British investigator. The composition of the rails with which he is concerned is: Carbon, 0.40 to 0.60 per cent; manganese, 0.80 to 1.10; chromium, 0.30 to 0.90; silicon, 0.30 max.; sulphur and phosphorus, 0.05 max. Cooled on the hot bed, rails of this nature would be brittle, he contends, but by sufficiently retarding the rate of cooling through the critical range, desirable

properties are secured. This is the procedure:

Pass the rails as they come from the rolls through a special chamber on the hot bed where the temperature is about 600 deg. C. By a choice of size it is possible to have sufficient rails inside the chamber at one time to maintain the 600 deg. C. temperature without external heat, at the same time maintaining a continual movement forward of finished rails.

This plan is asserted to make possible the use of alloy steels containing elements which induce air-hardening properties and consequent retardation of rate of grain growth through the critical range. Such steels heretofore have been considered unsuitable for rails. High resistance to shock and much greater wear resistance, it is claimed, as well as freedom from fissuring, can be attained in alloy steel rails containing about 0.50 per cent carbon, manganese less than 1.00 per cent and one or more elements such as chromium, nickel, tungsten, molybdenum, silicon and cobalt, totaling about 4 per cent, provided cooling conditions can be controlled to obviate brittleness and other harmful effects. It is asserted that this is effected by subjecting the rails on rolling to the action of heat-conserving means in proximity to the delivery from the rolls with the aid of a removable cover placed over the rails.

• • •

"Salty Coke" for Reducing Titanium Iron Ores

THE titaniferous iron ore deposits, particularly those in New York State, have been and still are a problem for the blast furnace metallurgist. Their smelting into pig iron has proved a trying problem. Refractory slags, due to the presence of the titanium in the ores, have been the great hindrance. Then, too, the large available supplies of non-titanium ores in the country have not made the question one of prime economic importance.

Word comes from Russia bearing on the subject. B. M. Suslov, in a letter to *Metal Progress* for August, describes operations which are claimed to have been successful in smelting in a Russian blast furnace high-titanium ores containing vanadium, with the combined object of recovery of both the vanadium and the titanium.

"Salty coke," or coke impregnated with salt, seems to be the key to the success. Charging salt into the coke ovens results in a salt-impregnated coke. Use of this coke in the regular

blast furnace burden, using an iron ore containing 16 per cent of TiO_2 and 0.65 per cent V_2O_5 , is reported to have been regularly used for 16 days. A high-grade pig iron was produced containing 0.80 per cent vanadium. The titanium content of the slag, which was fusible, was 42 per cent oxide of titanium, suitable for ultimate conversion into titanium pigment. Coke consumption is said not to have been increased and no operating difficulties were encountered.

• • •

Rare Metals to the Front

RESARCHES into the manufacture and useful applications of the rare metals are bearing much fruit. There is now a large number of rare metals which have not only been commercially isolated but are finding industrial uses. In the steel and iron industry some of these are finding practical applications as alloys or for other uses. Among these are columbium, zirconium, beryllium, selenium, tellurium, tantalum and so on. Others will doubtless join the procession in the future.

There are many other rare elements which are entering the industrial picture, such as thorium, germanium, gallium, indium, polonium, and so on—in industries outside the metal working. So important has become this development as a whole that a leading technical society is contemplating a symposium on the rare metals. This will undoubtedly bring out highly valuable information, some of it not yet generally known.

• • •

Forging Cu-Be Alloys

FOLLOWING the commercial development of rolled and cast products of beryllium-copper alloys, it has been found possible to forge this material. A forge company in Ohio has studied the conditions governing the forging, or drop forging, of these new alloys and has filled some orders. In any new product, such as the beryllium-copper alloys, which are subject to sharp changes in structure and properties unless definite temperatures are carefully controlled, it is not an easy matter to formulate rules by which the best results are obtainable. It is believed this has been accomplished so that forgings of beryllium-copper, combined with stipulated heat treatment, can be made which possess many of the properties which the rolled or cast alloys possess.

Gas Furnaces in Bolt and Nut Plant

*Examples of Equipment in Graham
Works, Neville Island, Pittsburgh, of
the Pittsburgh Screw & Bolt Co.*



▲ ▲ ▲

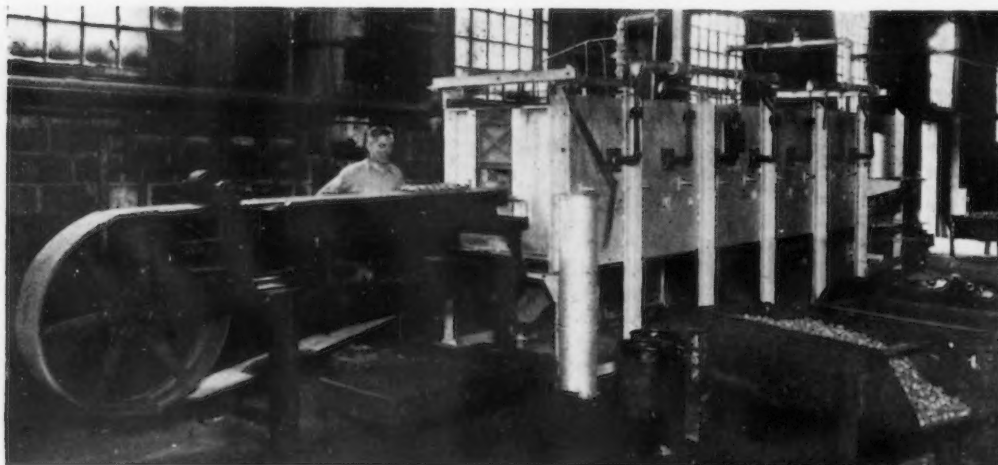
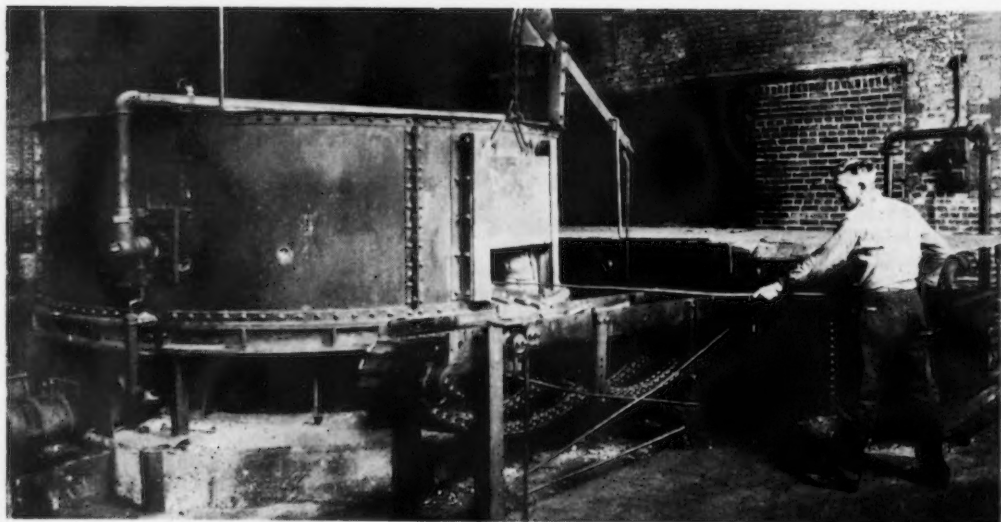
THE hot forging division contains 14 gas-fired furnaces serving as many automatic machines making bolts, nuts and rivets. The furnaces are 27 ft. long, 3 ft. square in cross-section and stand on 4-ft. legs. Some of them are fired with 24 Venturi-type gas burners, all located on one side wall; the entire set of burners on one furnace is supplied with high-pressure gas through one manifold and air through another. Other furnaces have eight nozzle mixing burners set in one side wall using low-pressure gas and air from a blower.

▼ ▼ ▼

▲ ▲ ▲

A ROTARY furnace for hardening heats is roughly 14 ft. in diameter. The moving hearth is of refractory brick, this replacing a floor of overlapping plates; the refractory center is now stationary, the roof was lowered by 18 in. to a level 16 in. above the hearth and mechanical difficulties of operation have been eliminated. The heating chamber is now 16 x 24 in. in cross-section. Three nozzle-type burners receive gas at 8 oz. pressure and air at 24 oz. delivered by a blower. The conveyor receiving the discharge from the furnace is reversible, in one direction delivering to a quench tank and in the other to containers.

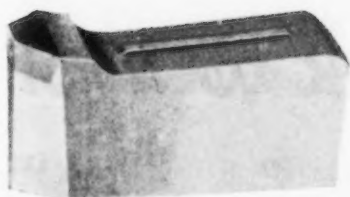
▼ ▼ ▼



▲ ▲ ▲

A DRAWING furnace 18 ft. long has a flat heat-resisting alloy mesh belt, motor driven, which extends 8 ft. beyond the furnace as an aid in loading. The sides of the furnace hearth are built up approximately 3 in. to keep the work from falling off. There are seven burners on each side, 14 in all, of the high-pressure Venturi type.

▼ ▼ ▼



An accurate fit between tooth and tip is essential.

Experience with Tungsten Carbide Saws

Extensive tests made at the Philadelphia Navy Yard it was conclusively demonstrated that large tungsten carbide inserted tooth circular saws would cut armor plate. One test was made cutting through 16-in. heat treated plate showing hard spots that Brinelled as high as 602. The special sawing equipment of the Philadelphia Navy Yard failed on this test, but a saw designed with Carboboy inserts made the cut without serious difficulty. The saw was 48 in. in diameter with a 9/16 in. plate. It had 48 inserted teeth consisting of 24 advanced teeth cutting a 3/16 in. kerf and set 3/64 in. higher than the remaining 24 square teeth which finished out the cut to 11/16 in. The teeth were set into the blades alternately, that is, an advance tooth was followed by a square tooth and the tungsten carbide inserts, following the usual practice, were brazed into the cutting edge of each tooth. A speed of 4 1/4 r.p.m. with a feed of 0.10 in. per revolution was used in making the cut.

As with other tungsten carbide fitted saws, a secure and rigid fastening of the tungsten carbide to the backing steel of the tooth was all-important. This tipping of saw teeth with tungsten carbide is done in a special department at the saw manufacturer's plant. The tungsten carbide alloy is received and stored at one end of the department. A large steel filing cabinet with shallow drawers is used for the principal storage of this valuable material which is received in the form of bars of different cross sections and different lengths and which is stored according to size and shape. Close to the storage cabinet are located two lapping machines on which the small parts are ground and lapped to the proper shape. Each lapping machine has a large cast iron disk which is rotated in a horizontal plane. These disks are coated with a mixture of fine olive oil and diamond dust and the tungsten carbide pieces are pressed down against the revolving disk by hand and thus lapped as desired. Specially designed gage blocks are conveniently mounted above the lapping disk so that the operator may check the shape and dimensions of

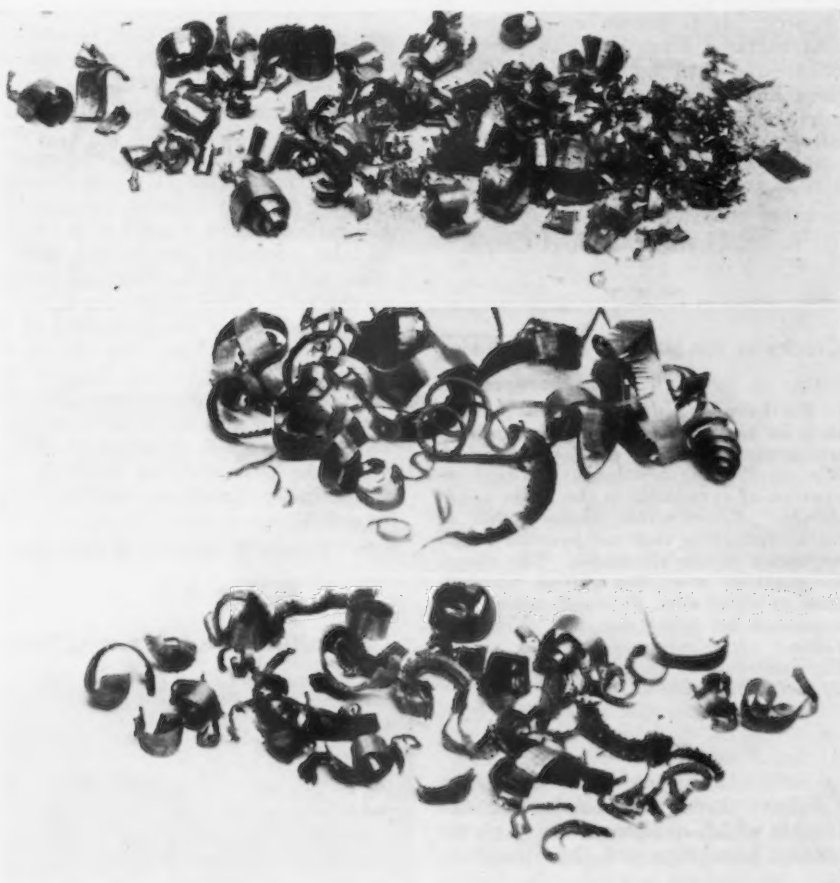
the piece he is lapping as the work progresses.

Secret of a Firm Bond

The secret of securing a firm bond between the tips and the tooth is chiefly one of precision workmanship in getting an accurate fit between the two parts before brazing. Most of the saws using tungsten carbide tipped teeth have been fairly well standardized so that the work in the tipping department is to some extent of a repeat or quantity production na-

ture. The tips are made up to shape at one end of the department and the steel backing forms are made at the opposite end. The two parts for each complete tooth are brought together at an assembly desk where they are selected and fitted for the brazing operation. After fitting, the parts are held in close contact in small jigs through the brazing sequence. The brazing is done in a hydrogen atmosphere in a furnace designed for the purpose with a long integral cooling

(Concluded on Page 67)



Top: After 15 min. cutting; r.p.m. 1.33; feed per revolution, 0.039 in.; peripheral speed, 15 ft. 8 in.

Middle: After 4 hr. cutting; r.p.m. 12 1/2; feed per revolution, 0.07 in., peripheral speed, 137 ft. 3 in.

Bottom: After 8 hr. 30 min. cutting; r.p.m. 3; feed per revolution, 0.08 in.; peripheral speed, 37 ft. 9 in.

Putting the Question Mark to Work

Forgings Rust Resisting at Ordinary Temperatures

Can you suggest a metal which will be rust resisting under ordinary weather conditions which can be used satisfactorily in drop forgings and which will have the strength of ordinary steel or better? The forgings must stand a cold bend test.

D. L. Ellis.

WE recommend our nickel molybdenum steel or S. A. E. 4615 steel, which will satisfy the mechanical conditions imposed. This steel will rust, but rusting will be comparatively slow. If complete protection against weathering is desired, it will be necessary to use one of the chrome-iron stainless compositions of a more complex alloy.

Timken Steel & Tube Co.

AN alloy used successfully for golf club heads seems to answer this inquiry. It is known as Enduro S, and contains from 12 to 14 per cent chromium with no nickel. While it does not have the all-around corrosion resistance of the standard 18-8 alloy, it has excellent forging properties, can be easily heat treated, and is rust resistant under ordinary weather conditions.

Republic Steel Corpn.

▼ ▼ ▼

Cracks in Normalized Deep Drawing Sheets

We have had difficulty with brittleness in tin sheets causing apparently unwarranted cracks in deep drawing. We ascribe the brittleness to agglomeration of cementite in the grain boundaries. Examination showed this to be so complete that no pearlite at all appeared in the structure. The sheets in question were hot rolled, normalized at 1750 deg. F., cold rolled and annealed at 1300 deg. F. The cold rolling after normalizing was slight, the increase in length amounting to 3/16 in. in 28 in.

J. S. C.

ANNEALING at 1300 deg. may have been responsible for the trouble which developed, although we should have expected this temperature to produce a grain size larger than normal. Agglomeration of cementite in the grain boundaries is not necessarily an indication of brittleness in low carbon tin plate unless it is accompanied by large grains or some other defects.

Joseph T. Ryerson & Son, Inc.

Welding Broken Cast Iron Rolls

Is there a satisfactory method of welding chilled rolls 24 in. in diameter, 3 ft. long, 6 in. thick, to repair damage caused by chipping off at the ends? The chill is from 1 in. to 1 1/2 in. deep. These rolls are cooled by water running through them and are used in the rubber industry.

R. S.

IT is the usual desire of the welder of cast iron to obtain a machinable surface, but in this case he desires to obtain a chilled cast iron surface. This means an unusually difficult problem which we believe could not be solved at a cost which would be attractive.

Lincoln Electric Co.

DIAMITE welding rod has been used successfully in repairing chilled iron rolls in cement crushing mills. These rolls, however, do not have a fine outside finish. We have had no experience in repairing chilled rolls used in the rubber industry and can only suggest that an old roll be repaired with Diamite rod and reground, as an experiment.

Weatherly Foundry & Mfg. Co.

IN the opinion of our engineering department, this is not a practical welding job. It is quite possible that the rolls could be welded with the use of the acetylene torch and with a filler rod of the same chemical content as the rolls. The procedure, however, would necessitate the annealing of the rolls and depositing the filler rod while the roll is in the furnace and hot. Then the roughness would have to be ground and the rolls rehardened and reground, all of which would involve the possibility of warping and undoubtedly would be too expensive to consider.

Joseph T. Ryerson & Son, Inc.

▼ ▼ ▼

Composition Rolls for Printing Presses

Can you give us a formula for composition rolls like those used in printing presses?

A. J. C.

GLUE and glycerine form the greater part of the ingredients used in these rollers, but whatever other materials are used are part of the formula of each roller maker. The machinery used is steel jacketed molds. The mold is heated with hot water and the composition is forced to the top of the mold. It is then cooled with cold water and the roller drops out by gravity.

E. L. T.

Electrical Heaters for Bar Mills

Do you know whether anyone is successfully using an electrical heating device at the point of entry on hot bar mills to help keep thin sections hot during the forming and finishing passes?

J. S. Co.

THIS application of electric heating was quite active in 1929-30 and at least one electrical manufacturer appropriated quite a sum of money to investigate its possibilities. Due to the necessary conservation of financial resources the appropriation was cancelled, and it is believed there is no existing electrical application of this type.

Y. S. & T. Co.

TO the best of our knowledge there is no mill that is using such a device for heating thin sections entering a bar mill, or, for that matter, any kind of a mill. A proposition similar to this has been tried in a theoretical way for heating thin sheets by means of high frequency current. We do not know whether this was put to practice, but believe it was not.

W. S. Co.

WE do not know of anyone using an electrical heating device at the point of entry on hot bar mills to help keep thin sections hot during the forming and finishing passes.

We have designed equipment for this purpose but as yet have not made a commercial installation and know of no one else who has.

Ajax Electrothermic Corpn.

▼ ▼ ▼

Lighter Steel Floors

Can you tell me the dead floor load usually figured for a large highway bridge?

K. G. M.

WE understand that the Washington Bridge across the Hudson shows a dead floor load, including wearing surface, of approximately 100 lb. per sq. ft. We also understand that on very long spans it takes 3 to 4 lb. of steel in cables, towers and anchors to hold up 1 lb. of dead floor load. Some new forms of floor design give a considerably lower dead floor load and an interlocking steel deck which we have developed we believe would show a dead floor load of 50 to 60 lb. per sq. ft.

Belmont Iron Works.

Sensitive Static-Dynamic Balancer for Small High-Speed Parts

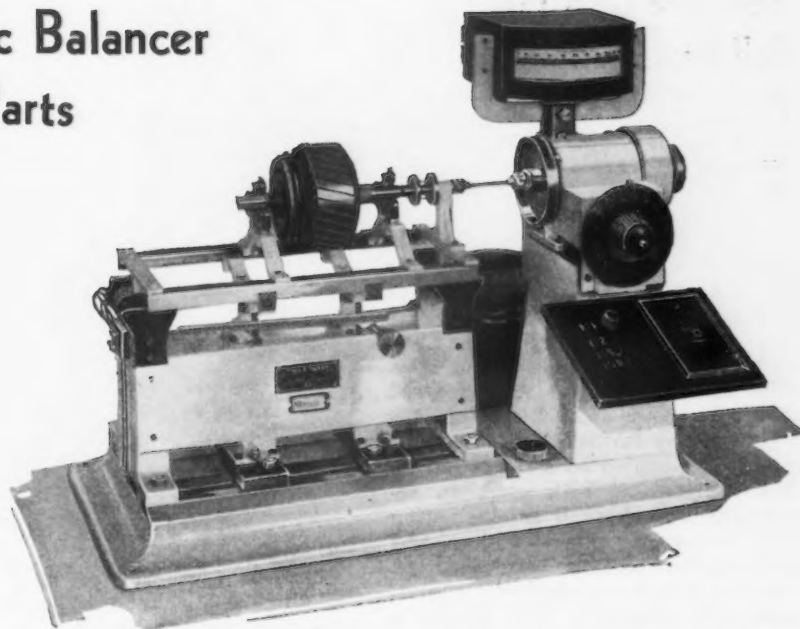
THE static-dynamic balancer illustrated is being offered by the Tinius Olsen Testing Machine Co., 500 North Twelfth Street, Philadelphia, for determining both the amount and angle of unbalance in the rotors of high-speed fractional horsepower motors and similar small rotating parts.

Sensitivity, accuracy and ease of operation are features of this new machine, which is designated as the Vibro-Electric self-indicating static-dynamic balancer, style E-O. Unbalance as small as 1/10,000 oz.-in. is said to be indicated, and angle of unbalance to plus or minus 1 deg. Four ranges of sensitivity may be obtained. Although a production machine, this balancer may be set quickly for various sizes and types of work. Output is said to be 40 or more rotors an hour, depending upon the class of rotor and the efficiency of the operator. Little skill is necessary in operating the machine, and operators may be trained quickly.

The part to be balanced is mounted in a cradle on two roller bearings held in place by spring-mounted retaining rollers. Vibration of the rollers, caused by unbalance in the rotor, generates alternating electric current proportional to the unbalance. The phase relation of this current to the rotation of the body indicates the angle of unbalance. The alternating current generated is rectified through a commutator device arranged with a dual brush system; from the position of the brush system the exact angle of unbalance is obtained, and from the electric meter the exact amount of unbalance.

In operating the balancer the work is first mounted in and coupled to the machine and the motor started by means of a switch. To determine the unbalance on the right-hand end of the work, the procedure is as follows: The operator turns a knurled knob to the right through 45 deg., then turns the large dial at the head end of the machine until a maximum indication of unbalance is shown on the electric meter above the dial. Next, he presses a button at the center of the large dial and at the same time turns the dial until the pointer on the meter moves to zero. Upon release of the push button the meter indicates the amount of unbalance and the dial shows the angle of unbalance, both of which the operator jots down.

If, instead of taking a record of the unbalance at the right-hand end of the work, the operator is required to mark the unbalance of the part, he may do so by stopping the machine and setting the graduated disk on the headstock to the angle indicated



Unbalance as small as 1/10,000 oz.-in. and angle of unbalance to plus or minus 1 deg. are indicated. Production is put at 40 or more rotors an hour.

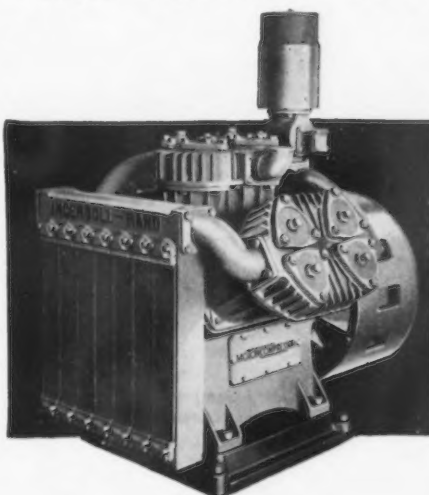
on the large dial, and marking the work accordingly. Usually, however, it is unnecessary to do this, as the operator after making his record may proceed directly to determine the unbalance of the left-hand end of the work. The procedure is the same except that the knurled knob is turned 45 deg. to left rather than right.

When the unbalance is thus determined the machine is stopped and the angle readings on the large dial are transferred to the dial on the headstock. The work is then marked, by a special indicating device, for either the removal or addition of metal.

The machine is provided with resistance in series with the meter, so that by plugging in at four different stations the machine has four capacities as to maximum amount of unbalance that may be indicated. The resistance selected also depends upon the closeness of the reading desired. The balancer can be furnished with a self-supporting base, or obtained for bench mounting. Two standard sizes are made; of these the largest handles parts weighing from 1½ to 12 lb., and indicates unbalance up to 1 oz.-in. Larger and special models can be furnished.

Air-Cooled Compressor with Built-In Motor

REQUIRING no cooling water, the new type air compressor illustrated is adapted for general service or as a



standby unit where water is scarce, costly, or objectionable. This machine, built by the Ingersoll-Rand Co., 11 Broadway, New York, is called the Motorcompressor, and, as its name implies, has a built-in motor. The motor rotor is carried on the compressor shaft and the motor frame is bolted directly to the compressor crankcase. This construction eliminates a coupling, as well as motor bearings.

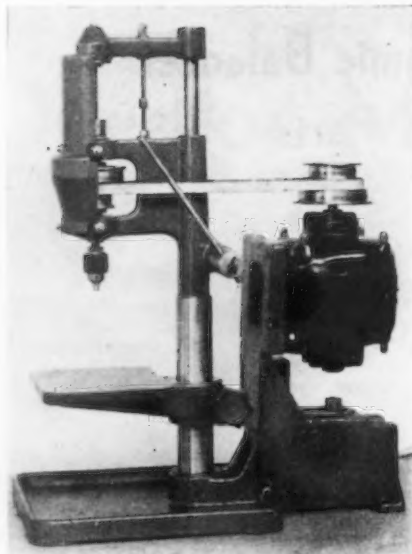
The Motorcompressor is a two-cylinder, two-stage machine. Cylinders and intercooler are air-cooled. Units are built in sizes from 20 to 50 hp., with piston displacements from 118 to 310 cu. ft. per min. and for discharge pressures up to 125 lb. gage.

The principal financial and economic questions of the day are discussed in a non-partisan treatise entitled "Dollars and Sense," by Irving Brant, and published by the John Day Co., Inc., New York. Problems taken up include, war debts, inflation, money, hoarding, gold basis of currency, the tariff war, etc.

Sensitive Drill Has Ball-Bearing Spindle

A ONE-QUARTER inch capacity sensitive drilling machine having a full ball-bearing spindle has been placed on the market by the Langelier Mfg. Co., Providence, R. I. Belt and motor-driven models for operation on a bench or floor stand can be furnished, also a treadle for foot operation.

The single-speed belt-driven model has a speed of 2500 r.p.m., and the motor-driven drill has speeds of 1250, 2250 and 3500 r.p.m. A high-speed unit with speeds of 2500, 4500 or 7000 r.p.m. is also furnished. The spindle pulley is mounted on a sleeve having ball bearings at both ends, an arrangement emphasized as eliminating belt pull on the spindle and thereby making the machine very sensitive. Alemite fittings are provided for lubricating the bearings. The spindle is hardened and ground; it is double splined for driving by a hardened broached nut attached to the end of the hardened spindle sleeve. A ball bearing is provided at the upper end of the spindle to take drill thrust. The distance from the column to the



spindle is 4 in., thus giving a swing of 8 in. The maximum distance from the chuck to the table is 6½ in. Total feed of the spindle is 2½ in. The motor bracket is provided with an adjustment for belt take-up. Overall height of the drill is 23¼ in., and bench space of 10 x 18½ in. is required. The weight of the machine, with motor, is 90 lb.

Compressed Air Dryer System

A COMPRESSED air drying system designed without moving parts is being offered by Ruemelin Mfg. Co., 1580 South First Street, Milwaukee. The complete outfit includes an aftercooler, a moisture expeller, an automatic drain trap and the necessary piping to connect these parts. Pipe sizes range from ¼ to 2 in. for air capacities from 40 to 150 cu. ft. For larger size compressors these drying systems are piped in multiple units to handle up to 450 cu. ft. of air per min.

The aftercooler is water cooled.

The moisture expeller, which is air cooled, removes water and oil suspended in a free state which may be carried over from the aftercooler. The drain trap drains all accumulated oil and water from both the aftercooler and the moisture expeller. The needle valve and its seat are made of rustless alloy metal.

Sheet Metal and Cable Tensile Strength Tester

FOR determining the tensile breaking strength of heavy and light metal sheet and cable the Amthor Testing Instrument Co., 309 Johnson Street, Brooklyn, N. Y., is offering

a new motor-driven horizontal type machine designed on the pendulum principle, with operation controlled automatically. For accuracy, the dial is hand calibrated and has double capacities for sensitive testing of the lighter materials.

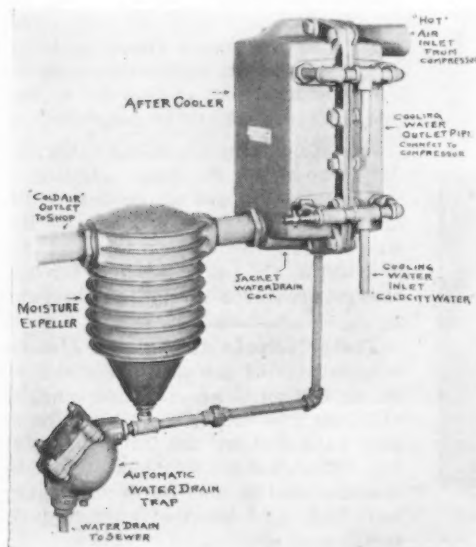
To make a test the specimen is first inserted in the machine and the "start" push button pressed, after which no further attention is required as the test completes itself. When the specimen breaks, the breaking strength is shown fixed on the dial. The motor and pulling clamp stop automatically and the pendulum arm returns automatically to position for the next test. Either an elongation indicator or autographic recorder can be had; clamps furnished are either the flat type for sheet metal, or automatic capstan or wedge type for cable. The machine is available in any capacity up to 1500 lb.

Speed Reducers with Planetary Gearing

SPEED reducers designated as the Planigrressive, with simple and compound planetary gearing, are being made by the Davis & Thompson Co., Milwaukee, and distributed by the Planigrressive Reducer Sales Co., of the same city. Standard reduction ratios range from 3 to 1 to 600 to 1, but higher reductions can be furnished. These units are designed to use a standard NEMA motors without any alteration, so that in case of motor failure, a motor of the same size and make can be substituted readily.

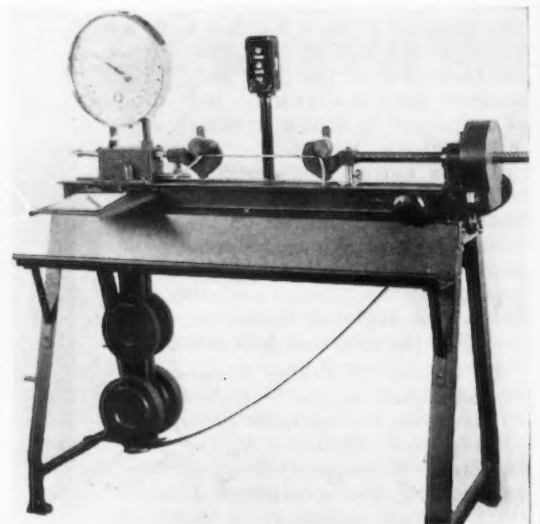
Three types of reducer and one speed increaser are made. The type A reducer is available in ratios from 3 to 1 to 7 to 1, the reduction being made through planetary gears. Sizes up to 3 hp. are made without feet on the reducer housing; those above 3 hp. have feet. The type B is made in ratios from 8 to 1 to 24 to 1, the reduction being obtained by the

(Continued on Page 37)



(At right) The pulling clamp of this tensile tester stops automatically at the predetermined point and returns automatically to the starting position.

(At left) Compressed air dryer designed without moving parts.



Railroad Freight Rates on Foundry, Malleable, Basic and Bessemer

AS in the case of finished steel, pig iron prices under the code are quoted on a delivered basis, determined by adding to the base price the railroad freight rate from basing point to point of delivery. Jackson, Ohio, has been omitted from the compilation, as it is used as a basing point only for silvery iron and Bessemer ferrosilicon. Provo, Utah, has also been omitted, as the furnace there is the only merchant producer in the far West.

Southern iron is sold in northern markets at an arbitrary differential of 38c. a ton under the delivered prices for northern iron at various points of consumption. Furnaces located in large consuming centers which are also basing points have an arbitrary freight rate of 50c. a ton within the respective switching districts, with the exception of the Chicago district, where the rate is 60c. a ton. With the exception of Birdsboro, Pa., basing points used in the chart do not apply on low phosphorus iron. Steelton, Pa., Standish, N. Y., and Johnson City, Tenn., are also basing points for low phosphorus iron.

NEW ENGLAND DISTRICT

Destination	Basing Point Everett, Mass.
Auburn, R. I.	\$1.30
Boston	.50*
Branford, Conn.	2.00
Bridgeport, Conn.	2.00
Franklin, Mass.	1.06
Hartford, Conn.	2.00
Hillsgrove, R. I.	1.45
Hyde Park, Mass.	.82
Mansfield, Mass.	1.06
New Britain, Conn.	2.15
New Haven, Conn.	2.00
Norwood, Mass.	.94
Pawtucket, R. I.	1.30
Phillipsdale, R. I.	1.30
Providence, R. I.	1.30
Putnam, Conn.	1.60
Stamford, Conn.	2.20
Taunton, Mass.	1.18
Waterbury, Conn.	2.30
Westfield, Mass.	2.45
Whitins, Mass.	1.30
Woonsocket, R. I.	1.18

*To all points in Boston switching district.

BUFFALO DISTRICT

Destination	Basing Point Buffalo
Albany, N. Y.	\$2.27
Batavia	1.13
Binghamton	2.27
Dunkirk	1.13*
Rochester	1.39
Schenectady	2.27
Syracuse	1.89
Troy	2.27
Utica	2.02

*Same rate from Erie, Pa.

CINCINNATI DISTRICT

Destination	Basing Point Hamilton, Ohio
Anderson, Ind.	\$2.27
Bloomington, Ind.	2.65
Cincinnati	1.01
Columbus, Ind.	2.27
Columbus, Ohio	2.00
Connersville, Ind.	1.50
Crawfordsville, Ind.	2.65*
Dayton, Ohio	1.26
Indianapolis	2.27
Kokomo, Ind.	2.65**
Louisville, Ky.	2.65
Marion, Ind.	2.50
Muncie, Ind.	2.27
Newcastle, Ind.	2.27
Newport, Ky.	1.01
Richmond, Ind.	1.50
Springfield, Ohio	1.64

*Same rate from Chicago.

**Same rate from Chicago and Toledo, Ohio.

EASTERN DISTRICT

Destination	Basing Points Bethlehem, Pa. Birdsboro, Pa. Swedesland, Pa. Point, Md.
Baltimore	\$0.90
Brooklyn	\$2.27
Burlington, N. J.	\$1.26
Chester, Pa.	.76
Coatesville, Pa.	\$0.76
Columbia, Pa.	1.39
Emaus, Pa.	.88
Florence, N. J.	1.26
Harrisburg, Pa. (R. R. R.)	1.39
Harrisburg, Pa. (P. R. R.)	1.64
Jersey City, N. J. (L. V. and C. of N. J. R. R.)	1.39
Jersey City, N. J. (D. L. & W.)	1.64
Jersey City, N. J. (Erie)	1.89
Jersey City, N. J. (P. R. R.)	1.64
Lancaster, Pa.	1.39
Newark, N. J. (P. R. R.)	1.39
Newark, N. J. (L. V. and C. of N. J. R. R.)	1.39
Newark, N. J. (Erie)	2.27
Newark, N. J. (D. L. & W.)	1.64
New Brunswick, N. J.	1.64
New York	2.27
Paterson, N. J.	1.64
Philadelphia	0.76
Phillipsburg, N. J.	0.63
Phoenixville, Pa.	0.76
Pottstown, Pa.	0.63
Reading, Pa.	0.63
Roebbing, N. J.	1.26
Somerville, N. J.	1.39
Trenton, N. J.	1.13
Wilkes-Barre, Pa.	1.64
Williamsport, Pa.	2.02
Wilmington, Del.	1.13
York, Pa.	1.64

CLEVELAND-PITTSBURGH

Destination	Basing Points Cleveland, Pa. Erie, Pa. Youngstown, Ohio
Akron, Ohio	\$1.26
Alliance, Ohio	1.13
Alverton, Pa.	\$1.13
Ashtabula, Ohio	1.13
Avonmore, Pa.	1.13
Beaver Falls, Pa.	1.13
Bellaire, Ohio	1.13
Blairsville, Pa.	1.13
Brackenridge, Pa.	1.13
Butler, Pa.	1.13
Canton, Ohio	1.26
Conneaut, Ohio	1.01
Connellsville, Pa.	1.13
Cumberland, Md.	1.13
Dunkirk, N. Y.	1.13*
East Pittsburgh, Pa.	1.13
Ellwood City, Pa.	1.13
Elyria, Ohio	.76
Franklin, Pa.	1.76
Geneva, Pa.	1.13
Greensburg, Pa.	1.13
Grove City, Pa.	1.13
Homestead, Pa.	1.13
Hyde Park, Pa.	1.13
Indiana, Pa.	2.50
Johnstown, Pa.	1.13
Mansfield, Ohio	1.76**
Martins Ferry, Ohio	1.13
McKeesport, Pa.	1.13
McKees Rocks, Pa.	1.13
Meadville, Pa.	1.39
Monessen, Pa.	1.13
Monongahela, Pa.	1.13
Mount Vernon, Ohio	2.00
New Brighton, Pa.	1.13
New Castle, Pa.	1.13
Ravenna, Ohio	1.26
Rochester, Pa.	1.13
Salem, Ohio	1.01
Sharon, Pa.	1.13
Sharpsburg, Pa.	1.13
Stoops Ferry, Pa.	1.13
Trafford, Pa.	1.13
Uniontown, Pa.	1.13
Warren, Ohio	1.13
Washington, Pa.	1.13
Wheeling, W. Va.	1.13
Wilmerding, Pa.	1.13

*Same rate as from Buffalo, N. Y.

**Same rate as from Toledo, Ohio.

DETROIT-TOLEDO DIS

Destination	Detroit
Adrian, Mich.	\$1.40
Akron, Ind.	2.40
Auburn, Ind.	2.40
Battle Creek, Mich.	3.05
Cadillac, Mich.	1.85
Flint, Mich.	2.70
Fremont, Ohio	2.70
Fort Wayne, Ind.	2.70
Grand Rapids, Mich.	2.70
Holland, Mich.	2.70

Basic and Bessemer Pig Iron in Carloads (Usual Minimum 25 Tons) (In Dollars per Gross Ton)

CLEVELAND-PITTSBURGH DISTRICT

Destination	Basing Points				Neville Island, Pa. Pittsburgh
	Cleveland	Erie, Pa.	Youngstown, Ohio	Sharpsville, Pa.	
Akron, Ohio.....	\$1.26	.....	.....	.....	.....
Alliance, Ohio.....	1.13	.....	\$1.13	.....	.....
Alverton, Pa.....	\$1.64
Ashtabula, Ohio.....	\$1.13	.....	.....	.....
Avonmore, Pa.....	1.26
Beaver Falls, Pa.....	1.13	\$1.13	1.13
Bellaire, Ohio.....	1.76
Blairsville, Pa.....	1.26
Brackenridge, Pa.....	1.13
Butler, Pa.....	1.13
Canton, Ohio.....	1.26	.....	1.26	.....	.....
Conneaut, Ohio.....	1.01	.....	.....	.....
Connellsville, Pa.....	1.64
Cumberland, Md.....	2.39
Dunkirk, N. Y.....	1.13*	.....	.....	.....
East Pittsburgh, Pa.....76
Ellwood City, Pa.....	1.13	1.13	1.13
Elyria, Ohio.....	.76	.....	.....	.....	.....
Franklin, Pa.....	1.76	1.76	.....	.....
Geneva, Pa.....	1.13	.....	.....	.....	.....
Greensburg, Pa.....	1.26
Grove City, Pa.....	1.39	1.39	.....
Homestead, Pa.....76
Hyde Park, Pa.....	1.26
Indiana, Pa.....	2.52	2.52	.....
Johnstown, Pa.....	1.76
Mansfield, Ohio.....	1.76**	.....	.....	.....	.....
Martins Ferry, Ohio.....	1.76
McKeesport, Pa.....76
McKees Rocks, Pa.....50
Meadville, Pa.....	1.39	.....	.....	.....
Monessen, Pa.....	1.13
Monongahela, Pa.....	1.13
Mount Vernon, Ohio.....	2.00	.....	.....	.....	.....
New Brighton, Pa.....	1.13	1.13	1.13
New Castle, Pa.....63	.63	.....
Ravenna, Ohio.....	1.26	.....	1.26	.....	.....
Rochester, Pa.....	1.13	1.13	.....
Salem, Ohio.....	1.01	.....	.....	.....
Sharon, Pa.....63	.63	.....
Sharpsburg, Pa.....50
Stoops Ferry, Pa.....63
Trafford, Pa.....	1.01
Uniontown, Pa.....	1.64
Warren, Ohio.....50	.....	.....
Washington, Pa.....	1.13
Wheeling, W. Va.....	1.76
Wilmerding, Pa.....76

*Same rate as from Buffalo, N. Y.
**Same rate as from Toledo, Ohio.

DETROIT-TOLEDO DISTRICT

Destination	Basing Points	
	Detroit	Toledo, Ohio
Adrian, Mich.....	\$1.40	\$1.40
Akron, Ind.....	.....	2.65*
Auburn, Ind.....	.....	2.00
Battle Creek, Mich.....	2.40	2.40
Cadillac, Mich.....	3.05	.....
Flint, Mich.....	1.85	.....
Fremont, Ohio.....	.....	1.39
Fort Wayne, Ind.....	.....	2.00
Grand Rapids, Mich.....	2.70	.....
Holland, Mich.....	2.70	.....

Jackson, Mich.....	1.90	1.90
Kalamazoo, Mich.....	2.65*	2.65*
Kokomo, Ind.....	.....	2.65†
Lansing, Mich.....	1.95	.....
Lima, Ohio.....	.....	1.71
Ludington, Mich.....	3.15	3.15
Mansfield, Ohio.....	.....	1.76**
Marion, Ohio.....	.....	1.76
Monroe, Mich.....	.....	1.00
Muskegon, Mich.....	2.90*	2.90*
Pontiac, Mich.....	1.40	.....
Saginaw, Mich.....	2.10	.....
Sandusky, Ohio.....	.....	1.39
Three Rivers, Mich.....	2.65*	2.65*
Traverse City, Mich.....	3.15	3.15
Wauseon, Ohio.....	.....	1.39
Wayne, Mich.....	.....	1.00

†Same rate as from Chicago and Hamilton, Ohio.
*Same rate as from Chicago.
**Same rate as from Cleveland.

WESTERN DISTRICT Western Michigan

Destination	Basing Points		
	Chicago	Granite City, Ill.	Duluth, Minn.
Benton Harbor.....	\$1.89	.....	.....
Kalamazoo.....	*2.65	.....	.....
Menominee.....	3.04	.....	.....
Muskegon.....	*2.90	.....	.....
South Haven.....	2.90	.....	.....
St. Joseph.....	1.89	.....	.....
Three Rivers.....	*2.65	.....	.....

*Same rate as from Detroit and Toledo, Ohio.

Indiana

Destination	Basing Points		
	Chicago	Granite City, Ill.	Duluth, Minn.
Akron.....	*\$2.65	.....	.....
Crawfordsville.....	**2.65	.....	.....
Elkhart.....	2.25	.....	.....
Evansville.....	.....	\$2.65	.....
Kokomo.....	†2.65	.....	.....
LaFayette.....	2.40	.....	.....
LaPorte.....	1.85	.....	.....
Logansport.....	2.40	.....	.....
Michigan City.....	1.40	.....	.....
Peru.....	2.40	.....	.....
South Bend.....	2.05	.....	.....
Terre Haute.....	2.37	.....	.....
Warsaw.....	2.65	.....	.....

*Same rate as from Toledo, Ohio.
**Same rate as from Hamilton, Ohio.
†Same rate as from Toledo and Hamilton, Ohio.

Destination
Alton.....
Aurora.....
Belleville.....
Belvidere.....
Bloomington.....
Centralia.....
Chicago Heights.....
Danville.....
East Moline.....
Elgin.....
Freeport.....
Hoopeston.....
Joliet.....
Kankakee.....
Moline.....
North Chicago.....
Peoria.....
Peru.....
Quincy.....
Rockford.....
Sterling.....
Waukegan.....

Wis

Destination
Algoma, Wis.....
Appleton.....
Ashland.....
Beloit.....
Cudahy.....
Eau Claire.....
Fond du Lac.....
Green Bay.....
Janesville.....
Kenosha.....
Kewaunee.....
La Crosse.....
Madison.....
Manitowoc.....
Menominee.....
Milwaukee.....
Oshkosh.....
Racine.....
Sheboygan.....
Superior.....
Waukesha.....
Wausau.....
Escanaba, Mich.....
Sault Ste. Marie.....

25 Tons) From Principal Code Basing Points

Illinois

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Alton		\$0.63	
Aurora	\$0.88		
Belleville		.88	
Belvidere	1.39		
Bloomington	1.64		
Centralia		1.26	
Chicago Heights	.63		
Danville	1.64		
East Moline	1.76	1.76	
Elgin	.88		
Freeport	1.39		
Hoopeston	1.39		
Joliet	.63		
Kankakee	1.39		
Moline	1.76	1.76	
North Chicago	1.00		
Peoria	1.54	1.54	
Peru	1.39		
Quincy	1.76	1.76	
Rockford	1.39		
Sterling	1.39		
Waukegan	1.00		

Wisconsin and Northern Michigan

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Algoma, Wis.	\$1.94		
Appleton	1.94		
Ashland			\$1.94
Beloit	1.39		
Cudahy	1.00		
Eau Claire			1.94
Fond du Lac	1.94		
Green Bay	1.94		
Janesville	1.39		
Kenosha	1.00		
Kewaunee	3.04		
La Crosse			2.67
Madison	1.64		
Manitowoc	1.94		
Menominee			1.94
Milwaukee	1.00		
Oshkosh	1.94		
Racine	1.00		
Sheboygan	1.50		
Superior			1.12
Waukesha	1.00		
Wausau	2.67		
Escanaba, Mich.			2.31
Sault Ste. Marie, Mich.			2.67

Minnesota and South Dakota

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Albert Lea			\$2.31
Fairmont			2.31
Hibbing			2.24
Mankato			2.31
Minneapolis			1.94
St. Cloud			2.31
St. Paul			1.94
Winona	\$2.31		
Aberdeen, S. D.			6.50
Sioux Falls, S. D.			4.30

Iowa

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Bettendorf	\$1.76	\$1.76	
Cedar Rapids	2.31		
Council Bluffs		3.27	
Davenport	1.76	1.76	
Des Moines	3.75*	3.27**	
Dubuque	1.76		
Iowa City	2.31		
Keokuk	1.76	1.76	
Mason City			\$2.31
Newton	3.75	3.75	
Sioux City			4.30
Waterloo	2.31		

*Applies on malleable iron.
**Applies on foundry iron.

Missouri

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Centralia		\$2.50	
Independence		2.54	
Joplin		4.00	
Kansas City		2.54	
Springfield		4.00	
St. Joseph		2.54	
Webb City		4.00	

Kansas

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Atchison		\$2.54	
Coffeyville		4.77	
Hutchinson		7.45	
Kansas City		2.54	
Ottawa		4.50	
Pittsburg		4.50	
Topeka		5.00	
Wichita		7.45	

Nebraska

Destination	Chicago	Basing Points	
		Granite City, Ill.	Duluth, Minn.
Beatrice		\$4.74	
Fremont		4.74	
Hastings		6.66	
Lincoln		4.74	
Omaha		3.27	

use of
gears
reduc
ratios
with



In the
throu
25:1



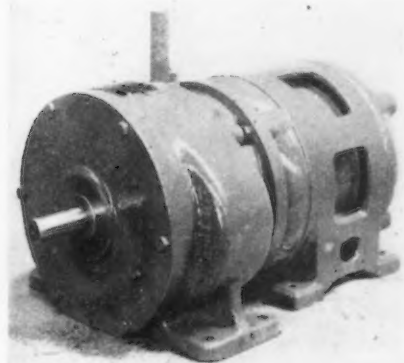
cial
as
rat
T
ple
tor
als
eng
or
out
con
era
of

S
V

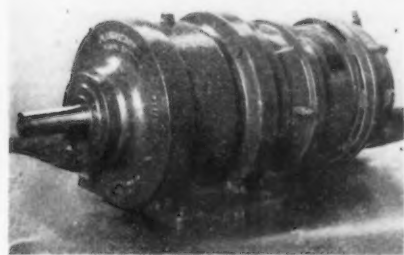
S
Fi
re
St

S
t
s
s
t

use of compound alloy steel helical gears. A type D unit, called the high reduction speed reducer, is also made; ratios range from 25 to 1 to 600 to 1, with higher reduction ratios made spe-



In the type B (above) the reduction is through compound helical gears. Ratios from 25:1 to 600:1 are standard in the type D reducer, below.



cial. A speed increaser, designated as the type C, is manufactured in ratios ranging from 1 to 1.1 to 1 to 5.

The reducers can be supplied complete with motors or mounted on motors supplied by the user. They can also be furnished for use with gas engines, water turbines, Diesel engines or other prime mover. The input and output shafts of standard reducers are concentric. Units may be had to operate in a vertical position, and a line of right angle reducers is also made.

Simplicity Features New Wire Rope Sockets

SIMPLICITY, with increased safety and economy, is a feature of the Fiege Tiger-Claw wire rope socket recently announced by the American Steel & Wire Co., 208 South La Salle



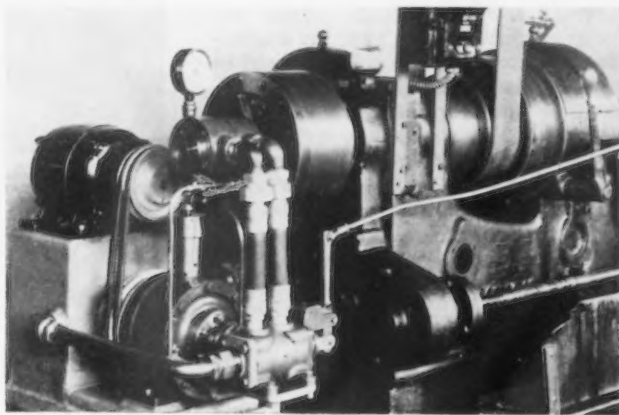
Street, Chicago. Made up of but three simple parts, namely, a socket, sleeve, and a plug, these wire rope sockets may be attached quickly in the field with ordinary labor. They

require no flame or hot metal, and the design is said to provide 100 per cent cable strength. The company is prepared to furnish data covering specific problems.

Electric-Hydraulic Chuck-Operating Unit

THE electric-hydraulic chuck-operating unit illustrated, manufactured by the Tomkins-Johnson Co., Jackson, Mich., is designed for working pressures up to 250 lb. per sq. in. It is compact and is arranged for con-

CHUCK - OPERATING unit designed for working pressures up to 250 lb. per sq. in. The motor runs continuously but is not under load except for short intervals.



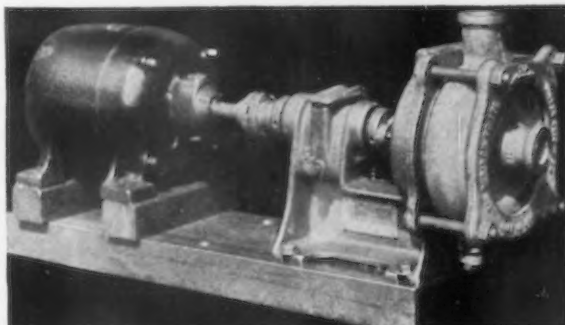
venient mounting upon the machine on which it is to be used.

Oil from the tank is pumped to the pressure required and circulated through a valve into a distributor and cylinder. The chuck is released through a valve that reverses the flow of oil into the opposite end of the cylinder. A predetermined pressure level is maintained at all times. The motor, although running continuously, is not under load except for short intervals when the pressure having dropped is being built up to the required level. By-passing of the oil has been eliminated, and this, it is stated, avoids heating the oil to any appreciable degree.

Small Pump for Handling Corrosive Material

THE centrifugal pump illustrated is being offered by the Duriron Co., Dayton, Ohio, for handling corrosive

THE Duriron pump at right designed for handling corrosive fluids, has a 1-in. suction and 1-in. discharge. The impeller is of closed type.



chemicals. It has a 1-in. suction, 1-in. discharge, and at 1750 r.p.m., the head and capacity range from 2½ g.p.m. at a 25-ft. head to 25 g.p.m. at a 5-ft. head, with power consumption varying from approximately ¼ hp. to less than ½ hp. These figures are based on water. This pump, the Model 2A, is the smallest built by the company, and is available in either belt or direct motor drive types. It has a closed-type impeller.

The pump is furnished in Duriron, for general acid service; in Durichlor, for hydrochloric acid; in Durimet, a low-carbon nickel-chromium silicon alloy steel, for weak sulphuric acid at

all temperatures; in Durco alloy steels (low-carbon "18-8"—KA2S and KA2SMo); in Alcumite, a copper-aluminum-iron alloy, for weak sulphuric acid; and in the chemical lead alloys.

Kinhead to Lecture On Weld Design

WELD design and production is the subject of a course of six lectures covering welding from a metallurgical and engineering standpoint that will be given under the auspices of the Cleveland Chapter of the American Society for Steel Treating by Robert E. Kinhead, consulting welding engineer, Cleveland. These will be given in the Bingham Mechanical Building at Case School of Applied Science, Monday evenings starting Oct. 23.

Automatic Screw-Down Control

FOR automatically controlling the movement of screw-down motors in accordance with a predetermined schedule a controlling device, designated as the automatic Preset screw-down control, has been brought out by the Electric Controller & Mfg. Co., Cleveland. A schedule giving the proper draft for each pass for a specified ingot or bloom may be worked out by the blooming mill superintendent or metallurgist. The control is set up for this schedule on a plug panel. The screw-down operator simply pushes a button for each pass and the rolls are moved to the exact setting specified.

This control has been worked out to meet the requirements of almost any type of mill. A set-up may be provided for as many rolling schedules as desired and a change from one schedule to another may be made by pushing a button. In the case of a cobbler or other emergency condition the operator has available the usual hand control. When used with finishing mills the system is found to assure accurate control of the gage.

A small synchronous-tie motor is mounted on the mill and geared to the screw-down drive. A control bench in the operator's pulpit carries a master switch controller for the screw-down motor and also push buttons and indicating lights. Schedule set-up panels and cut-out limit switch mechanism are located in the control room.

The set-up panel, Fig. 1, illustrates the system. Main roll adjustments are made on the right side in steps of $2\frac{1}{4}$ in. Vernier adjustments are made on the left. Those shown are for $1/16$ -in. adjustments and may be made up to $1\frac{1}{2}$ in. plus or minus in relation to the main adjustments.

The panel is arranged for adjust-

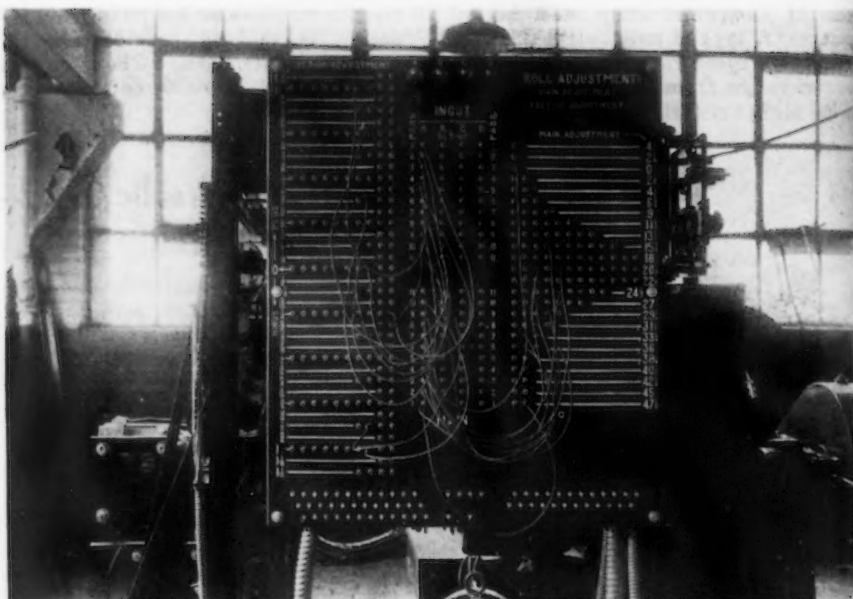


Fig. 1—Arrangement of connections for the automatic operation of the screw-downs may be made to cover four different rolling schedules, as provided for in the center of the panel. At the right the main adjustment in steps of $2\frac{1}{4}$ in. is made and at the left the vernier adjustment.

ments for four different rolling schedules and with 11 passes for each schedule. There is a plug receptacle for each pass, these being arranged in a vertical row, one row for each complete rolling schedule. The letters A, B, C, and D (under "ingot") cover receptacles for each of four separate rolling schedules. Figures at the side of the receptacle plugs indicate the pass. In making adjustments for the amount of reduction in the various passes two leads are set up for each pass, one end being plugged in the main adjustment side of the panel and the other in the set-up side. The other ends of the two leads are plugged in the receptacle inlets for the proper schedule and pass in the central part of the panel. A light at the top of the panel under the letters designating the rolling schedule shows which rolling schedule is being followed.

The operator has complete control of the screwdown from the control bench shown in Fig. 2. For normal operation the operator uses but one button, the center button which causes

the rolls to move to the correct position and stop accurately. For the next and other succeeding passes this button is again pressed, the proper roll opening being selected automatically by the pressure of the button. The equipment stops the rolls accurately within less than plus or minus $1/32$ in. with a maximum roll opening of 45 in.

At point 2 in Fig. 2 is a low-voltage protection button used for initially applying power to the equipment and for resetting in case of power failure. No. 3 is a master switch for emergency hand operation. By moving it in the desired direction at any point in the cycle of operation the adjustment of the rolls is instantly transferred from the automatic equipment to manual operation control by the operator. To resume automatic operation this master switch is returned to the off position.

The button at 4 is a set-up button for manual selection of any desired pass and is used only for an emergency. Should the operator have finished the schedule by hand operation and wish to set the equipment on No. 1 pass for the next ingot he presses the button 5 at the right, which causes a quick return to No. 1 pass. An indicating lamp is provided for each pass. As the equipment advances current is automatically transferred from the preceding lamp to the next one, the lights showing the operator the operation at all times.

It is claimed that with the automatic screw-down control the quality of the steel will be improved because the danger of taking too great reductions during the first passes in breaking down an ingot in a blooming mill will be avoided. Proper and accurate

(Concluded on Page 41)

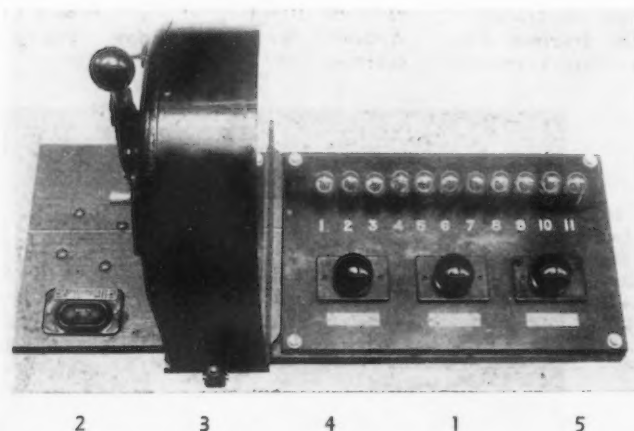
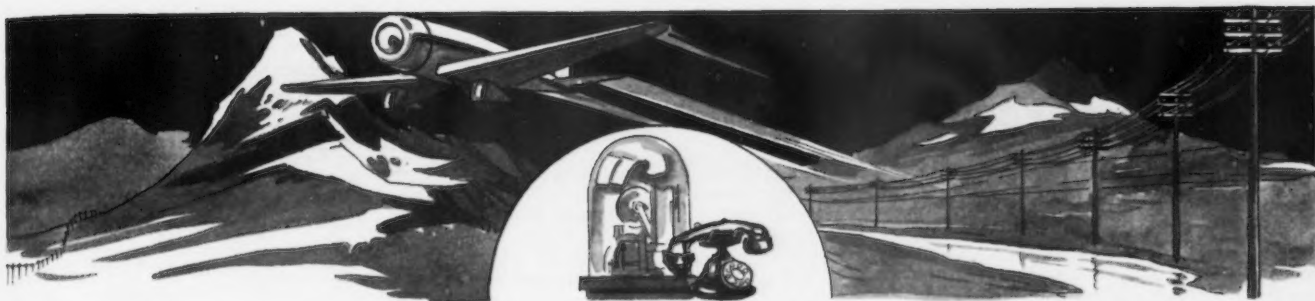


Fig. 2—In front of the operator is the control bench. For normal operation he needs to push button No. 1 only, once for each pass.



THE NEWS OF THIS WEEK

Home Demand Increasing For British Iron and Steel

LONDON, ENGLAND, Oct. 17 (*By Cable*).—With demand for pig iron increasing and Cleveland stocks practically exhausted, it is expected that additional blast furnaces will be put into commission before the end of the year. Some producers of hematite are also well booked. A price advance is also anticipated soon as a result of increasing prices of fuel and ore.

Demand for semi-finished steel is

strong and the market for heavy steel is also improving.

September exports of pig iron were 8000 tons, including 55 tons shipped to the United States. Total exports of both steel and iron for September aggregated 157,000 tons.

The price of tin plate is firming because of recent advances in the price of steel but output remains level at about 65 per cent of capacity. Germany has recently sold tin plates to Holland at the equivalent of 16s. 3d. basis.

Overseas demand for Continental iron and steel is improving but United Kingdom business has not contributed to the improvement. The International Raw Steel Cartel is maintaining its last quarter quota at 500,000 tons per month.

International Rail Makers' Association complain that Poland has sold 14,000 tons of rails to Holland.

Broken Hill Proprietary Co., Ltd., states that construction of its Australian tin plate mills will not be commenced before the end of next year.

Italy expects to contract to supply Rio de Janeiro with additional equipment for its underground railway at a payment of from 300 to 400 million lire in English pounds. If this contract is obtained, a consortium of Italian coffee importers is prepared to buy an equivalent amount of Brazilian coffee.

Detroit Foundrymen To Be Guests of Buick

MEMBERS of the Detroit Foundrymen's Association will be the guests of the Buick Motor Co. at Flint, Mich., on Oct. 19, with the program in charge of Buick officials. Peter W. Blackwood, foundry superintendent, will make an address on "Twenty-five Years' Progress in Iron" and George P. Christopher, vice-president

in charge of plant operations, will speak. Arthur Farbis of the Buick company will talk and show motion pictures on "Twenty-five Years of Automobile Progress." R. G. Rogers, foundry manager, will be general chairman of the meeting.

International Harvester Expands Employment

INTERNATIONAL HARVESTER CO. has announced that beginning Nov. 1, former employees will be hired progressively until 4000 are reemployed in all of its plants. The Milwaukee works will add 700 men under its reemployment program. The policy of providing winter work has been followed for two years, although on a lesser scale. When purchasing power of the farmers is substantially increased it will be possible to move the goods, officials of the company said.

Bliss Notes Steady Gain In Machine Tool Orders

MACHINE TOOL orders have shown a steady increase during the last six weeks, and are substantially above the summer level, it was stated today by Philip E. Bliss, president of the Warner & Swasey Co., Cleveland.

"The orders are mostly for replacement of existing equipment," said Bliss. "The individual orders are small, but the number of them is larger; and they are coming in from a wide variety of industries. Apparently manufacturers, in general, are beginning to rehabilitate their plants with the expectation of better business through the winter."

"While the level of the machine tool business is still far below normal, it is better than it has been for two years. Considering the small amount of replacement or repair that has taken place in plant equipment since 1930, any increase in industrial activity as a whole must inevitably be reflected in increasing volume for the machine tool trade."

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export	£9		
Billets, open-hrth.	£5 5s.	to	£5 12s. 6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	16s. 9d.	to	17s.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hrth.	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage.	£9 5s.		
Galvanized sheets, No. 24 gage.	£11 5s.	to	£11 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86

*Ingots	£2 5s.
*Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
*Steel bars, merchant	£3
*Sheet bars	£2 8s.
Plates, ¼ in. and up	£3 18s. 6d.
*Plates, ½ in. and up	£4 1s.
*Sheets, ½ in.	£4 6s.
*Ship plates	£4 10s.
*Beams, Thomas	£2 16s. 6d.
*Angles (basis)	£3
Hoops and strip steel over 6-in. base	£3 15s.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

*Prices as established by European Raw Steel Cartel.

Tentative Program Announced for Chicago Convention of A. I. S. C.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION will hold its 11th annual convention in the Stevens Hotel, Chicago, Oct. 19 to 21, inc. The banquet, to be held on Friday night, Oct. 20, is expected to attract unusual interest in the industry because of the importance of both speakers and subjects. One of the banquet speakers will be Col. H. M. Waite, deputy administrator of the Federal Emergency Administration of Public Works.

Saturday, Oct. 21, has been set aside as "Century of Progress" day, on which convention members will attend the fair.

The tentative program follows:

THURSDAY, October 19

9.00 a. m. to 10 a. m.—Registration.
10 a. m.—President's Annual Address, Clyde G. Conley; Reading of the Minutes of the last Annual Meeting; Treasurer's Annual Report; Appointment of Committees: (a) Nomination; (b) Next Convention; Report of Executive Director, Charles F. Abbott; Report of Technical Activities, F. H. Frankland, Director of Engineering Service.
2 p. m.—Address, "Structural Advances in the Sky Ride and Observation Towers," Dr. D. B. Steinman, Consulting Engineer, New York; Discussion.
3 p. m.—Address, "Small Plant Production Analysis," W. F. Barnes, President,

St. Louis Structural Steel Co., East St. Louis, Ill.; Discussion.

4 p. m.—Address, "Cromansil Steel for Structural Purposes," W. B. Miller, Consulting Engineer, Union Carbide & Carbon Corp., New York; Adjournment.

8 p. m.—A symposium, "Steel for Residences," Chairman, F. T. Llewellyn, United States Steel Corp., New York; Address by Otto von Halem, Stahlwerks-Verband, A. G. Duesseldorf, Germany; illustrated with lantern slides. Address by Colonel L. Iere, Office Technique pour L'Utilisation de L'Acier, Paris, France. Illustrated with motion pictures.

FRIDAY, October 20

9.30 a. m.—Code of Fair Competition for Steel Construction—Its Operation, Chairman, C. G. Conley, President, The Mt. Vernon Bridge Co., Mt. Vernon, Ohio. Discussion led by members of the Code Committee: G. H. Blakeley, President, McClintic-Marshall Corp., Bethlehem, Pa.; R. P. Hutchinson, President, Bethlehem Fabricators, Inc., Bethlehem, Pa.; C. Edwin Michael, President, Virginia Bridge & Iron Co., Roanoke, Va.; L. A. Paddock, President, American Bridge Co., Pittsburgh; W. M. Wood, President, Mississippi Valley Structural Steel Co., Decatur, Ill.
2 p. m.—Continuation Discussion Code of Fair Competition.

4 p. m.—Unfinished Business; New Business; Report of Committee on Time and Place of Next Convention.

5.30 p. m.—Adjournment.
7.30 p. m.—Annual Banquet, Toastmaster, President Clyde G. Conley. (Speakers to be announced.)

The other nine members of the MAPI executive committee, as announced by Mr. O'Leary, follow:

I. N. Beeler, of the Ames Iron Works, Syracuse, N. Y., representing the Steam Engine Manufacturers Association;

J. G. Benedict, of the Landis Machine Co. of Waynesboro, Pa., representing the National Machine Tool Builders Association;

P. C. Brooks, vice-president of Fairbanks, Morse & Co., of Chicago, representing the Scale and Balance Manufacturers Association;

W. C. Dickerman, president of the American Locomotive Co., of New York, representing the Diesel Engine Manufacturers Association and the Railway and Industrial Spring Association;

Robert E. Friend, president of the Nordberg Manufacturing Co., of Milwaukee, representing the Hoist Builders Association;

Russell C. Jones, vice-president of Griscom-Russell & Co., of New York, representing the Heat Exchange Institute;

D. C. Keefe, executive vice-president of the Ingersoll-Rand Co., of New

York, representing the Compressed Air Institute;

C. E. Searle, executive vice-president of the Worthington Pump & Machinery Corp., of Harrison, N. J., representing the Hydraulic Institute; and

George P. Torrence, president of the Link Belt Co., of Chicago, representing the Association of Conveyor and Material Preparation Equipment Manufacturers.

Lupton Plant To Be Auctioned

THE machinery, stock and equipment of David Lupton's Sons Co., 2263 E. Allegheny Ave., Philadelphia, will be sold at auction on Oct. 24, 25, 26 and 27, 1933, by order of the trustees in bankruptcy.

David Lupton originated the business over 60 years ago by investing a capital of \$700 in a limited stock of hardware, stoves, heaters, ranges and tin roofing. From a most humble start the concern grew to be one of Philadelphia's "big" manufacturers with sales offices and warehouses throughout the United States. During the post-war period their sales reached a volume of ten and one-half million dollars annually in the manufacture and installation of metal sash and steel factory and store equipment. In 1921 Lupton's secured what was probably the largest single order in the history of this industry—the furnishing of side wall and roof sash for the Ford factory in Detroit. If the sash furnished for this project were laid edge to edge it would cover about twelve and three-quarters acres and to open and close this sash over 22 miles of mechanical operator was installed. Many of this country's finest industrial plants contain modern types of Lupton sash.

The sale at auction includes a large stock of Lupton products as well as the quantities of machinery and equipment required for their manufacture. It will be conducted under the management of Samuel T. Freeman & Co.

September Employment In Metal Trades Gained

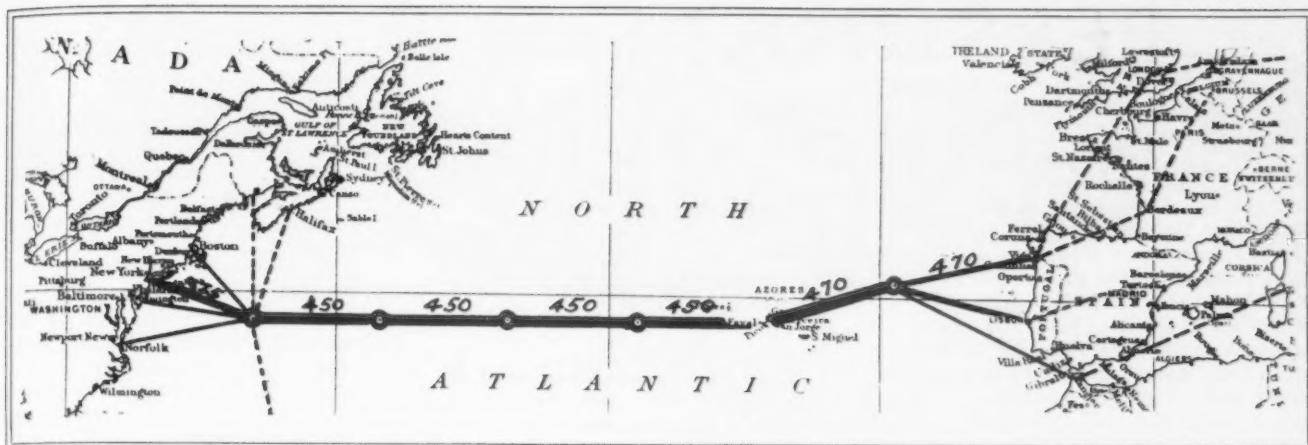
METAL trades employment, as reported by the National Metal Trades Association, showed an increase of 6.3 per cent in September over August. The report covers 26 cities. Gains were shown in 22 and losses in but four localities. These were Columbus, Ohio, Grand Rapids, Mich., Toledo, Ohio, and Detroit.

In all of the 14 industries on which the association receives reports, the employment trend was upward during September.

Executive Committee Named for MAPI

APPOINTMENT of an executive committee of 13 members to direct the affairs of the rapidly growing Machinery and Allied Products Institute, one of the largest industrial groups brought into being by the N. R. A., is announced by John W. O'Leary, its president.

Included in the committee, which will speak for companies and machinery trade associations representing a combined payroll of more than 180,000 skilled workers, are George H. Houston of Philadelphia, president of the Baldwin Locomotive Works, and also spokesman for the American Steel Tire Manufacturers Association; Harold C. Smith of Chicago, president of the Illinois Tool Works, and spokesman for the Metal Cutting Institute; C. S. Wagner of Milwaukee, president of the National Equipment Corp., and representative of the Concrete Mixers Manufacturers Institute; and A. M. Mattison of Rockford, Ill., president of the Mattison Machine Works, and spokesman for the Association of Manufacturers of Woodworking Machinery.



Seadrome Corporation Asks NRA For Millions to Bridge Atlantic

IN a petition to the Federal Emergency Administration of Public Works, the Seadrome Ocean Dock Corp. asks for \$30,000,000 for the self-liquidating project of building and operating five landing platforms at intervals across the Atlantic Ocean. The seadrome is a steel and iron open-work structure with the landing deck 100 feet above waterline, and buoyancy tanks averaging 40 ft. below the waterline. Waves, in full gale, pass through the supporting columns without breaking or exerting any impact on the structure. When tests were conducted on a 2-ton working model in 1929, waves 180 ft. in height to scale, and simulated gale conditions, failed to produce any noticeable pitch or roll.

The five seadromes would require 125,000 tons of steel and about 50,000 tons of pig iron ballast. It is estimated that 10,000 men would be employed immediately, upon acceptance of the project, and the work would

continue for over two years. It is also pointed out that large sums of money would be used immediately in order to start construction on suitable transatlantic airplanes.

In supporting their application, the Seadrome officials compare the total cost to that required for one airplane carrier of the Saratoga class. All the facilities of airports at sea will be made available to transport airplanes; complete service will be provided at frequent intervals, and radio beacons, together with ocean patrol service, are expected to reduce the usual hazards of air travel to a minimum. Air transport companies will be licensed, by franchise, to operate over the seadrome route on a toll basis, thereby establishing transatlantic air service in the hands of American interests. Europe will be within 24 hr. of travel to New York. The 1,000,000 passengers and 4,000,000 lb. of letters, which yearly cross the Atlantic in heavily subsidized ships, are expected

eventually to transfer, in a very large part, to the projected air route.

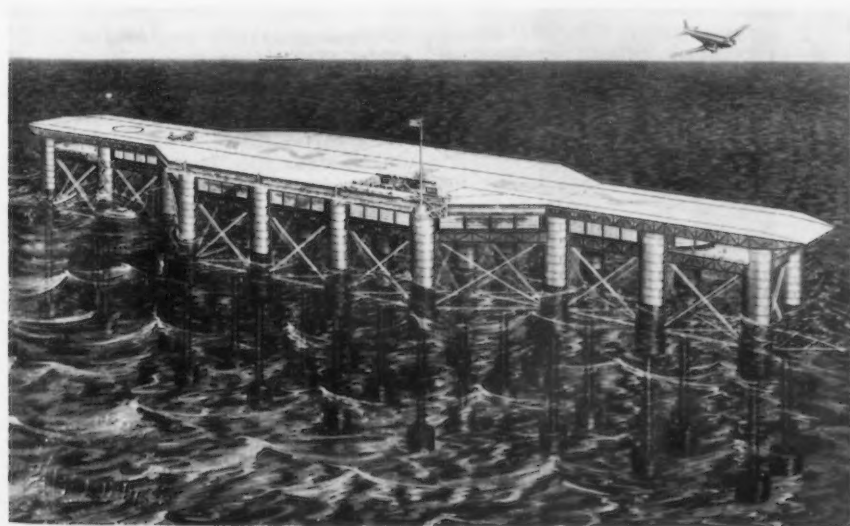
Each seadrome will have over 275,000 sq. ft. of space for plane maneuvering, and the hotels, shops, radio apparatus, etc., will be established between decks. Each unit will have a displacement, on service duty, of about 63,000 tons. The first unit will be anchored between New York and Bermuda, and the complete route to Europe has been fixed to give the best climatic conditions for flying. It is expected that the seadromes will enjoy some favor as ocean resorts.

The project was first conceived by E. R. Armstrong in 1913. Since that time, the foremost authorities, both here and abroad, have cooperated over a period of years in working out the structural form. Details of design and construction have been elaborated and verified by companies which include: Sikorsky Aviation Corp., Belmont Iron Works, Sun Shipbuilding and Dry Dock Corp., General Electric Co., and H. J. Gielow, Inc., naval architect.

Automatic Screw-Down Control

(Concluded from Page 38)

drafts, it is pointed out, will always be secured irrespective of change of operators or of the degree of skill of operators, and a definite schedule of passes and drafts properly suited to the steel can be rigidly adhered to, insuring a uniform product. Other points emphasized are that output can be increased by eliminating lost time in setting rolls for each pass, that error of human judgment is removed, that greater accuracy may be secured when used on finishing mills and there will be fewer rejections, that the efficiency of operators will be increased by the removal of mental and physical strain, as they merely push a button to follow a specified rolling schedule, and that the training period for new operators will be reduced.



PERSONALS

EVANS WARD, vice-president and general manager of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has been elected president and general manager of the company, succeeding the late William L. Ward. He has been associated with the organization since his graduation from Yale University in 1907. After several years at the Rock Falls, Ill., plant, he was made general manager in 1914 and vice-president in 1923. He is also vice-president of the American Institute of Bolt, Nut and Rivet Manufacturers, and a member of its code com-

steel sheets, strips, and plates, recently placed on the market by the American Rolling Mill Co., Middletown, Ohio. Mr. Butterfield will be assisted by E. E. JONES. Production in the various plants is under the direction of R. E. CURRY and W. L. WOODWARD, both of whom are assistants to the vice-president in charge of operations.

F. H. LEGGETT has been elected treasurer of Western Electric Co., to succeed F. L. GILMAN, who will retire Oct. 31. Mr. Leggett started as a

the Nippon Electric Co., Tokio, and later manager of the Bell Telephone Mfg. Co. at Antwerp. In 1909 he became foreign sales manager in New York. He has also served the company on the Pacific Coast. Mr. Leggett is succeeded at his New York post by W. E. GATHRIGHT, of St. Louis, general manager of the distributing organization throughout the Western States.

E. C. CRITTENDEN, heretofore chief of the division of electricity of the United States Bureau of Standards, has been appointed assistant director of that bureau in charge of research and testing, to fill the vacancy created by the appointment of Dr. L. J. BRIGGS to the directorship of the bureau last June.

Mr. Crittenden was born in Pennsylvania and spent his early days in Ithaca, N. Y., where he was graduated from Cornell University in 1905. Since 1925 he has represented the Department of Commerce as a member body of the American Standards Association. He is a member of the American Institute of Electrical Engineers, the American Physical Society, and the honorary fraternities Phi Beta Kappa and Sigma Xi.

LLOYD JONES, who has been manager of the Salem, Ohio, works of the E. W. Bliss Co., Brooklyn, N. Y., has resigned. He is being succeeded by L. W. NASH, who has been with the company for a number of years as chief designing engineer in the rolling mill department of the Salem works.

J. R. COMSTOCK, formerly identified with the Hanna Furnace Co., Buffalo, has been appointed superintendent of the Globe Iron Co., Jackson, Ohio, maker of silvery and other high-silicon iron. Mr. Comstock has recently been engaged in an advisory capacity on engineering work in the U. S. S. R. with the Freyn Engineering Co., Chicago. GEORGE F. BERTSCH, who has been identified with the Globe Company for many years, is assistant superintendent and chief chemist, and A. H. DIERKER, lately senior metallurgical research engineer for the Ohio State University, is research metallurgist.

M. H. GEISKING, formerly manager of sales for the New Orleans district office of the Tennessee Coal, Iron & Railroad Co., and for the past two months assistant to the general manager of sales, has been elected vice-president and general manager of sales, succeeding ROBERT GREGG, who as announced in these columns last week has been made president.

H. STANLEY ROGERS, general manager and a director of Heppenstall Co., Pittsburgh, has resigned. He has been associated with the company since 1923.



EVANS WARD



W. S. KNUDSEN



J. P. BUTTERFIELD

mittee. He was active as a member of the committee on development of American standards for bolts, nuts and rivets.

WARREN L. WARD has been elected vice-president. He has been with the company 25 years, and since 1917 has served as assistant sales manager. He was graduated from Yale in 1908.

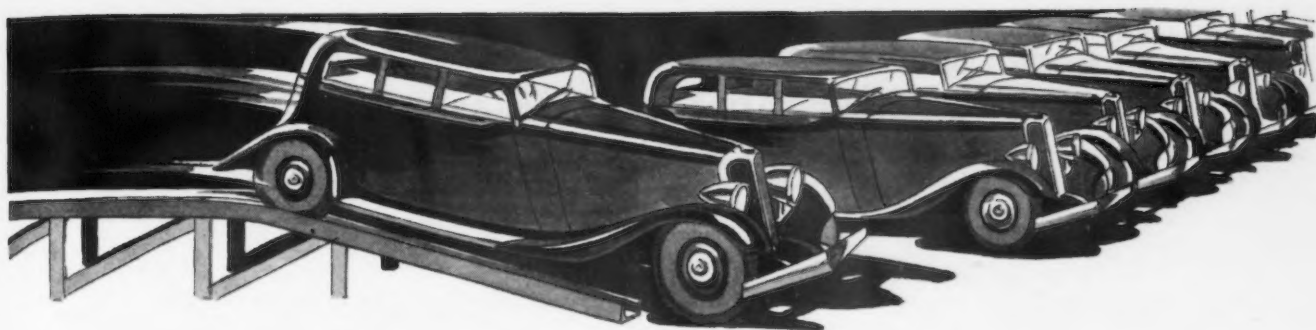
W. S. KNUDSEN has been appointed executive vice-president of General Motors Corp. at Detroit, becoming the chief executive officer of the corporation in Detroit and assuming general supervision over all car and body manufacturing operations both in the United States and Canada. He had previously been a vice-president of the corporation and president of the Chevrolet Motor Co. and in the latter capacity made an outstanding record in entrenching Chevrolet in first place in the industry in volume of sales. During the past year the Pontiac Motor Co., division of General Motors Corp., as well as the Chevrolet company, has been under his direction.

J. P. BUTTERFIELD, formerly manager of the Armco development department, has been appointed director of sales and production of stainless

clerk with the company after being graduated from Dartmouth in 1898. He has held executive posts with several of the foreign subsidiaries of the company, having been secretary of



J. E. MALONEY, whose appointment to the sales managership of the frame and heavy stampings division of the Murray Corp. of America was announced in these columns last week.



▲ ▲ ▲ THIS WEEK ON THE ASSEMBLY LINE ▲ ▲ ▲

Delays on New Models to Cut Down Fourth Quarter Production

DETROIT, Oct. 17.

FOURTH quarter production of automobiles promises to be considerably less than was earlier anticipated because of a combination of reasons. First and foremost, manufacturers are reluctant to introduce new models until they secure more accurate data than they now possess regarding materials and labor costs during 1934. These two major items, seriously affected by NRA codes, are known to have increased manufacturing expenses, but how far the increases will go in the next 12 months is anyone's guess at the moment. Steel, for example, has risen an average of about \$10 a ton, but there is no guarantee that still higher costs of steel making than prevail today may not in the next three to six months force steel prices to still higher levels. A comparable situation exists in other materials used extensively by the motor car industry. Then there is always present the desirability of raising wages of automotive employees further in case the industry continues to progress along the road to recovery.

With such uncertain cost factors facing them, automobile makers are pretty much at sea regarding the retail prices which they should put on 1934 cars. They are favoring the plan of cleaning up their present run of cars and then coasting along for 30 to 40 days before doing much in the way of assembling new jobs. The longer they wait, the clearer will be their insight into next year's costs and the better will be their ability to accurately price new cars. There is little danger that manufacturers in the light car market will put too high a price tag on their new series; competition is so severe as to prevent that. The danger is that the price will be too low, and upward revision

of prices in the middle of a selling season is highly undesirable.

Strike Delaying New Models

Aside from the price problem, the strike of tool and die makers is delaying the preparation of new models. Even though tool and die work is done in shops outside Michigan, there necessarily has been a slowing down of the tooling program which will be reflected in a later start than usual on 1934 production. Another important factor contributing to late introduction of new cars is the radical change in springs and independent suspension of front wheels contemplated by several manufacturers. This problem alone is keeping engineering and production chiefs busy night and day. No factory has yet had any experience in making coiled springs, and even the most optimistic motor car man admits that there will be plenty of grief in getting this innovation under way.

It is not surprising, therefore, that the prospect of early showing of new cars by major companies has faded from view and that, prior to the drawing of space for the New York Show this week in Detroit, automotive executives seriously discussed whether new models would be far enough along to hold the show at the scheduled time in January. It finally was decided to go ahead with the original program, although it may be necessary for some manufacturers to exhibit hand-built cars because they will not yet be in volume production by show time.

These facts alter somewhat the outlook for the remainder of the year. While assemblies in October still are estimated at about 145,000 units, there will be a sharp drop in November, with December showing little improvement over November. That

means that the industry will go through a lean period in the final 60 days of 1933. It is not an encouraging prospect for the steel trade, which has received such strong support from the automobile industry in the last six months.

While it is virtually impossible to secure accurate figures about the amount of steel in storage at Detroit, it is roughly estimated that Ford, General Motors and Chrysler have laid down 150,000 to 175,000 tons at pre-code prices. In some items it is reported that Chevrolet and Chrysler have enough tonnage on hand to fill their requirements during not only the entire fourth quarter, but also part of the first quarter of the coming year. Many parts companies, particularly the wheel makers, likewise have stocked all the steel they could finance with the help of the motor car manufacturers. In some instances steel users are hard put to find storage space for steel. Chrysler, which has been by far the heaviest purchaser, is using every available nook and cranny in its plants to pile steel. Despite the recent wave of forward buying, the steel tonnage placed by the leading automobile companies at code prices has been better than anticipated, although it necessarily has been light. The local steel trade is not expecting resumption of volume purchases by the automotive industry for 30 to 60 days.

Performance of Leading Makers

Chevrolet is planning to clean up production of its current models this month, with assemblies totaling 35,000 to 40,000 jobs. Ford's operations at the Rouge plant have fallen off considerably. The daily rate is now about 1500 units, as against 2000 a week or 10 days ago. Ford is understood to have adopted the program

of running five days a week and then closing down for several days during each month so as to come within the code requirements of a 35-hr. week. Carrying out this scheme, it will be idle the first part of this week. Ford is preparing to operate four out of its 10 open-hearth furnaces. It is said to have little basic iron at Rouge, its stock pile there consisting mostly of foundry grades. It will be recalled that earlier in the year Ford sold about 40,000 tons of basic to a Cleveland steel company. It evidently is not contemplating resumption of blast furnace activities in the immediate future. Chrysler, particularly the Dodge and Plymouth divisions, is turning out cars in a volume only slightly less than in September. Pontiac, like Chevrolet, will finish its 1933 run this month.

Developments in connection with coil springs indicate that the steel industry will secure more rather than less tonnage from this innovation. Carbon steel will be replaced by a slightly larger amount of alloy steel. The two support arms, in the form of a wish bone, attached to the frame and supporting the engine, will be of high manganese steel; the knuckles will be of the same material. The coil springs will be enclosed in a box made of strip steel. Car frames will have either a higher carbon content than at present, to give greater tensile strength, or will be made from heavier-gage steel. The alloy steel stock from which the coil springs are made will be centerless ground. It is understood that coil springs will be used on all cars turned out by one leading manufacturer and on two lines produced by another company.

Under the automobile code, the labor cost of building a General Motors car has increased an average of \$21.00. Chevrolet today is employing 45,000 men as compared with 33,000 prior to the date when the code became operative. This does not include Fisher Body employees working on Chevrolet bodies.

Detroit Notes

It is said that Mr. Ford has passed word along to his purchasing department to do nothing which might be construed as an attempt to break down code prices. . . . Chevrolet and Chrysler are refusing to sign the standard steel contract devised by the industry under the code, preferring to write their own contracts. . . . Motors for the half-ton International Harvester trucks formerly made by the Wilson Foundry & Machine Co. at Pontiac, subsidiary of Willys-Overland, will be built at the Harvester's Rock Island, Ill., plant. . . . Plymouth dealers sold 5630 cars during the first week of October. . . . September domestic sales of passenger cars and trucks are now estimated to have been 185,000 units. . . . Of the 3858 12-cylinder cars registered in the first eight months of this year, Lincoln accounted for 1576. . . .

Settlement of Tool and Die Strike to Be Negotiated at Washington

DETROIT, Oct. 17.—With representatives of both sides summoned to Washington for a conference tomorrow by the National Labor Board, an early settlement of the local tool and die strike is in prospect. In issuing invitations to the conference, the board ruled that "employees on strike are employees of a company for purposes of negotiating a settlement of the strike and for collective bargaining." This evidently was in answer to automobile companies which had contended that employees by striking had voluntarily given up their jobs and no longer were employees. Until the government intervened, these companies had virtually refused to deal with the strikers, declaring that there was nothing to negotiate.

W. S. Knudsen, executive vice-president General Motors Corp., and C. C. Richards, president Allied Products Corp. and head of the tool and die manufacturers' association, will be the spokesmen for the employers at Washington. Matthew Smith, president Mechanics Educational Society, will represent the strikers. Alvan Macauley, president National Automobile Chamber of Commerce, has been invited to represent his organization, which has the task of "policing" the labor policies of the tool and die employers who are signatories of the automobile code.

Replying to the criticism leveled by the strikers at John M. Carmody, who as mediator was accused of favoring employers, the National Labor Board in a formal resolution thanked Mr. Carmody for "excellent work on a very difficult and complicated situation."

The strikers from the beginning have insisted that settlement of the strike be taken to Washington with both sides sitting at the same table. This would mean recognition by the employers of collective bargaining. Strike leaders, therefore, are making no attempt to conceal their elation at the summons to the capital.

To demonstrate publicly that employers were wrong in their contention that the strike was breaking up the past week, on Thursday the strikers staged a parade down Woodward Avenue and thence to Clark Park where a mass meeting was held. The number of men in line was variously estimated at 5000 to 7000. Friday night a mass meeting was called by the strikers to which automobile production men were invited. The production men were urged to form committees in their shops and then organize a general strike.

Chester M. Culver, manager of the Employers' Association of Detroit,

estimates that 10 plants are working at a satisfactory rate. All 10 are outside the jobbing field, where the strike has been most effective. "Of the 3259 men who walked out of automobile plants," said Mr. Culver, "1948 have returned. In the job shops employees are coming back more slowly, but they are coming back. Of the 3000 men who walked out, about 800 or 900 are now back at work."

An interesting mayoralty race has developed in Dearborn, home of the Ford Motor Co., where Clyde V. Ford, cousin of Henry Ford and Ford retail dealer, is opposed by David Jones, first national vice-president of the Auto Workers' Union. Mr. Ford is the present incumbent.

U. S. Building 2 Per Cent Of World's New Ships

ACHECK in the long continued decline of world production of merchant vessels of 100 tons gross and upwards is shown by a statement just issued by Lloyd's Register of Shipping, for the quarter ended Sept. 30 last, covering shipbuilding returns from all maritime countries except Russia, for which figures have not been available for some time past.

Of the ten leading shipbuilding countries of the world, gains are reported during the quarter just ended for the United States, Great Britain and Ireland, France, Japan, Holland and Denmark. Declines were recorded for Germany, Sweden and Spain, while no change was shown in the amount of ship construction under way in Italy, Lloyd's Register states.

The aggregate gain in world output over the quarter ended June 30 last was 24,000 gross tons, or about three per cent in excess of the June 30 total of 732,495 gross tons.

For the United States, there was a gain of 11,000 gross tons, as compared with an advance of 16,000 tons for Great Britain and Ireland, 9000 tons for Holland, 4000 for Denmark, and about 3000 tons each for France and Japan. For Germany there was a decline of 19,000 tons, as against losses of 7000 tons for Sweden, and about 1500 tons for Spain.

The United States, which at the end of June was building less than one-half of one per cent of the world's merchant shipping production, now has about two per cent of the world output in hand, while the proportion for Great Britain and Ireland is slightly over forty per cent, and for all other maritime countries, taken as a group, slightly under 58 per cent.



THIS WEEK IN WASHINGTON

Captive Mine Management to Operate Conditional Check-Off

Will Deduct From Wages of Miners Individually Requesting It But Will Not Make Blanket Collection for U. M. W.

WASHINGTON, Oct. 17.—Acceptance by steel companies of a modified form of the check-off system at their coal mines was acknowledged by President Roosevelt with the understanding that the conditional terms of the operators do not "interpret, modify, or qualify any existing statutory requirements or the exercise of any administrative discretion."

The President made this reply to the letter received last Thursday from Nathan L. Miller, general counsel for the American Iron and Steel Institute, in which Mr. Miller said steel operators would accept the check-off to the extent of recognizing "voluntary orders for payments of any portion of the wages of any employees of our coal mines for dues to any organization of which he may be member, to the extent that we are legally permitted so to do." Coupled with this condition was the provision that the employees shall be free to join or not to join any union as they please with the understanding that protection from interference be given those who do not want to join the union. Mr. Miller pointed out that objection to the check-off was based on the belief that "the inevitable consequence of the adoption of such a system will be the closed shop, unless it can be adequately safeguarded."

The communication makes it clear that the steel companies are expecting that safeguard.

The President, in his letter of acknowledgment, of the terms of the steel companies, expressed gratification of progress being made between George Moses, president of the H. C.

By L. W. MOFFETT

Resident Washington Editor, The Iron Age

Frick Coke Co., and Phillip Murray, vice-president of the United Mine Workers of America, for the settlement of the strike at the Frick mines.

"I note also that Mr. Moses, of the H. C. Frick Co., is engaged in negotiations with Mr. Murray as representative of your employees who are members of his organization," the President stated. "I am gratified to note this progress and I trust that negotiations may proceed—as you say—with the utmost dispatch in a very earnest effort to reach a solution of this difficult problem."

Johnson Wants Miners to Resume Work

GEN. HUGH S. JOHNSON, National Recovery Administrator, at a press conference last Friday said that he considered if the miners do not now return to work they will be holding up the NRA program. He pointed out that the President requested them to go back to work and expressed the opinion that they have tried to do so.

"In addition to the miners asking for the check-off a great many demanded absolute recognition of the United Mine Workers of America, a contract with that name in it, but it is a great question as to whether that has been yielded even technically or otherwise," it was suggested to General Johnson.

"Well, I will tell you; it is just like the question of the open shop and the closed shop," replied General Johnson. "I do not know what the word 'recognition' means and I have never been able to get anybody to define it in a way that makes sense."

"Don't you think the miners got all they expect to get?" he was asked.

"They are negotiating an agreement as I understand it," General Johnson replied. "All I know about it is what you saw in the correspondence and reports from the United Mine Workers that they are engaged in negotiations through Mr. Murray and Mr. Moses."

Ex-Gov. Miller's Letter

LETTER of Nathan L. Miller, general counsel, American Iron and Steel Institute, addressed to President Roosevelt, accepting voluntary check-off at steel company coal mines.

"The undersigned companies, operating directly or through affiliated companies' so-called captive coal mines, have been advised of your letter of Oct. 9, 1933.

"Each renews the assurance which has been previously given to you and which was restated by the committee invited to confer with you on Saturday that we are desirous of cooperating to the fullest extent in your recovery program.

"We understood at the conference on Saturday that the only point of difference in which it was left that we could go further in our cooperation related to the collection of dues from those of our employees who were members of a union.

"As we attempted to make plain to you in our letter of Oct. 6, 1933, our objection to the so-called 'check-off' system is that we believe, in the light of past experience, that the inevitable consequence of the adoption of such a system will be

the closed union shop, unless it can be adequately safeguarded.

"Under the National Recovery Act we are required to employ our workers without regard to their membership or non-membership in any labor organization and we feel that we owe a duty to protect our employees who do not desire to be coerced into joining a union.

"However, we will recognize voluntary orders for payments of any portion of the wages of any employees of our coal mines for dues to any organization of which he may be a member, to the extent that we are legally permitted so to do under the laws of the respective States in which our operations are conducted, on the understanding that all of our employees shall be free to join or not to join any union as they please, and that any of our employees who do not wish to join a union will, in some effective way, be assured of adequate protection from interference, restraint or coercion of any kind. It is not our intention to surrender any right which we may have to afford them such protection."

The letter was signed by officials of the Republic Steel Corp., Inland Steel Co., Jones & Laughlin Steel Corp., Wheeling Steel Corp., Crucible Steel Co. of America, Interlake Iron Corp., Mather Collieries, Pittsburgh Steel Co., The Corrigan-McKinney Steel Co., The Youngstown Sheet & Tube Co., Columbia Steel Co., H. C. Frick Coke Co., National Mining Co., Hostetter-Connellsville Coke Co., Sharon Coal & Limestone Co., United States Coal & Coke Co., United States Fuel Co., Tennessee Coal, Iron & Railroad Co., Bethlehem Mines Corp., and the Weirton Coal Co.

Non-Ferrous Ingot Employment Above 1929

WASHINGTON, Oct. 17.—Differences developed over wage and hour provisions at the hearing last Friday on the code of fair competition for the non-ferrous ingot metal industry before Assistant Deputy Administrator H. M. Halstead, Jr. He requested that a committee representing the industry remain after the hearing for a conference with representatives of labor.

Among suggestions made by David Kaplan, general representative of the American Federation of Labor, was for an hourly rate of 50c. for factory employees compared with a minimum of 35c. for male and 30c. for females, proposed in the code. Also Mr. Kaplan urged that a 30-hr. week be substituted for the proposed 40-hr. week.

The code was presented by I. Glueck, manager, Chicago district, Federated Metals Corp., on behalf of the Non-Ferrous Ingot Metals Institute. Mr. Glueck said the Institute is believed to represent 90 per cent of the production. Employment in September was estimated to be well over 1200, while the average employed in 1929 was estimated at 1180.

Pennsylvania Railroad recently added 1000 men to its payroll. This action follows the addition of 10,000 men since June 1.

Approval of Longer Work Week Seen for Capital Goods

WASHINGTON, Oct. 17.—The demand of organized labor for the 30-hr. week was dealt a blow at joint hearings on codes of fair competition for the canning and packing and packaging machinery industries last Wednesday before Assistant Deputy Administrator George S. Brady.

B. C. Skinner, Dunedin, Fla., representing the Florida Citrus Fruit Machinery Co., was attacking the 30-hr. week when he (Mr. Brady) interrupted and inquired if Mr. Skinner had received the impression that the Administration was asking for a work week of 30-hr. Mr. Skinner replied that R. S. Newham, representing the metal trades department of the American Federation of Labor, had requested such a week. Deputy Brady replied that "in these capital goods industries, the head of the Labor Advisory Board has ruled quite otherwise." Coming from the Labor Advisory Board the ruling covering capital goods industries is especially effective and of great importance to the steel, metal-working, foundry and other industries coming under the classification of producers' goods.

Possibility that large cities "might be whittled down" and decentralization of industry brought about if rural areas received the advantage of wage differentials under NRA codes was advanced by Ogden S. Sells of the Canning and Packing Machinery Institute.

Support of the small town canning machinery manufacturer was also given by Mr. Skinner, who stated that his company used water transportation by way of Tampa, Fla., in preference to rail shipment, and used trucks to carry its products to and from Dunedin to the point of shipment. He said that higher wage rates in his plants would cause dissatisfaction among the farm hands who picked the citrus fruit. Small town employees, he said, are much better off than those in larger centers because living is cheaper and amusements "mostly free."

The canning and packing machinery code sets a minimum factory wage at from 32c. to 40c. an hour and a minimum weekly wage of from \$12 to \$15, depending on population. The packaging machinery code proposes a flat minimum wage of 40c. an hour for factory workers.

Mr. Newham asked for the 30-hr. week and a minimum wage of 45c. an hour for both machinery industries. Referring to the provision in the codes restricting the number of learners who would get only 80 per cent of the minimum pay to 5 per cent of the total number of workers, Mr. Newham quoted Secretary of

Labor Frances Perkins to the effect that it was feared such a provision would seriously hamper the working of the NRA codes. He declared that 5 per cent of the learners might actually mean anywhere from 20 to 25 per cent of the total number of workers since employees in the industries are mainly skilled workers.

Mr. Sells said that the minimum wage paid in 1929 was only 3c. an hour above the minimum provided for at present, while the average wage in 1929 was only 2c. an hour above the present, despite the fact that "sales for the first half of 1933 were only 12 per cent of what they were in 1929." "This," he said, "might be an indication that this industry is not chiseling." Mr. Sells stated that in 1928 an hour of labor produced \$3.41 in sales while in 1933 an hour of labor produced only \$1.64 in sales, showing that labor's share in the sales dollar increased from 18½c. in 1928 to 33½c. in 1933. The average wage in communities under 15,000 population in 1929 was said to have been 48c. an hour compared with 46c. an hour in 1933, while the average overall wage rates in larger centers in 1929 had been 71c. compared with 58c. in 1933. The average work week in communities under 15,000 population in 1929 was 53-hr. compared with 38-hr. in 1933, while in the larger cities in 1929 it was 47-hr. compared with 37-hr. in 1933.

Both codes provide for a tolerance of 10 per cent over the basic working hours per week, with no overtime wages, and representatives of both industries said that it is a vital provision in view of the fact that 98 per cent of their business deals with highly perishable products, and "the sun and rain do not recognize any NRA codes."

It was pointed out that the seasonal periods come in the canning and packing industry from June through November, when 80 per cent of the business is done, the remaining 20 per cent being leveled over the remainder of the year.

In defending the lack of overtime pay for workers in the canning and packing code, Mr. Skinner pointed out that 70 per cent of the business of his plant is done from June to October and that if overtime were paid workers during this period "they would become extravagant in their living expenses and would be unable to adjust their expenses when lean periods came."

The American Sheet & Tin Plate Co. has removed its Detroit office to 9-204 General Motors Building. James A. Smith, Jr., is Detroit manager of sales.

State Restrictions on Use of Improved Equipment Attacked

WASHINGTON, Oct. 17.—Attack on the policy of State Government prohibiting the use of machinery on construction projects was made at a hearing on the code of fair competition for the construction machinery distributing or retail trade before Assistant Deputy Administrator George Brady on Monday of last week.

"If we are prohibited from selling machines, we should be prohibited from paying taxes" was the thrust of J. J. Moore of Day & Maddock, Cleveland. Mr. Moore exhibited an order of the Ohio State Government forbidding use of machinery in preference to hand labor.

"We all appreciate the situation, but nothing can be done about it in the code," replied Industrial Adviser Willard T. Chevalier.

Among several provisions of the code which Mr. Moore criticized was one which prohibits dealers from ac-

cepting used equipment in trade-ins and later selling it at a profit.

Assistant Deputy Brady said that a majority of an industry or trade could put into a code "anything they want and it is likely that the Administrator will approve it, even if in some cases, ordinarily speaking, it is illegal. If the majority wants the provision banning trade-ins, it is probable that they will get it. Manufacturers do not have to go into the second-hand business any more than you have to take your suit of clothes down to a second-hand dealer. The same reasoning applies generally to the problem of rentals."

Mr. Moore said that he is not a member of the Associated Equipment Distributors, sponsors of the code. It was presented by E. K. Hurst, Sioux Falls, S. D., chairman of the code committee. The code provides a maximum 40-hr. week, with tolerance, and minimum wage rates of 40c. an hour, with exceptions.

\$25,000,000 More From P. W. A. For Non-Federal Projects

WASHINGTON, Oct. 17.—Allotments totaling \$24,846,611 for 27 non-Federal projects were included in a list announced last Wednesday by the Federal Public Works Administration, \$8,000,000 being a loan and grant to the Sanitary district of Chicago to complete five contracts which were let by the Sanitary district in 1931, but on which work was suspended because of lack of funds. The portion of the allotment which is loaned will be secured by Government purchase of Sanitary District of Chicago bonds. The remainder of the Chicago project, it was stated, involves both litigation and legislation which will require careful study before further loans are made. The work to be done with the loan just made consists of building of a pumping station, blower house and aeration tanks for the Calumet Sewage Treatment works; batteries of Imhoff tanks for the West Side Treatment Works and two sections of the West Side sewer of the Sanitary district.

To Danville, Va., went a loan and grant of \$3,000,000 for the construction of a 10,000-kw. hydroelectric plant with dam and tunnel together with transmission lines and necessary substations. Work is to begin at once.

The County Board of Arlington County, Virginia, was allotted a loan and grant of \$2,500,000 to use in the

construction of a system of trunk lines, sanitary sewers, lateral sewers and two primary treatment plants. Work can be started in two months.

A loan and grant of \$1,500,000 went to Franklin County and the State Road Department, Florida, to construct a toll bridge across Apalachicola Bay. Work can start within one month.

Construction of an earth dam on the Pecos river with a power house and transmission line for irrigation and power generation will be undertaken through the use of a loan and grant of \$2,600,000 to the Red Bluff Water Control District, Pecos, Tex. Work can begin immediately. A loan and grant of \$1,430,000 to San Antonio, Tex., will be used for the construction of a trunk sewer and lateral sewers, treating plant extension, a dike and irrigation canal. Work can be started in three months. Salt Lake City, Utah, will construct and repair sidewalks, streets, bridges, water mains, pipe lines, canals, reservoirs, municipal buildings and parks and playgrounds through the use of a loan and grant of \$2,500,000. Work can start in one month.

Among other allotments were the following: Wilmington, Del., \$435,000, grant, to Board of Education, to aid in construction of high school building at total cost of \$1,867,500. Work can begin in 30 days.

Pawtucket, R. I., \$425,000, loan and grant, for construction of city hall building. Work can start in one month.

Westminster, Md., \$289,000, loan and grant, for construction of complete sewerage system and treating plant. Work can start in one month.

El Paso County, Colo., \$939,111, loan and grant for construction of high school building and renovating of adjacent building units. Work can start in two months.

Monte Vista, Colo., \$300,000, loan, to Santa Maria Reservoir Co., for replacement of 8200-ft. of 4-ft. pipe line with wood stave or steel pipe 7-ft. in diameter and construction of wooden flume, etc. Work can start May 1.

Nashville, Tenn., \$400,000, loan, to George Peabody College for Teachers, for construction of dormitory and dining hall. Work can start in 30 days.

Beaver Dam, Wis., \$210,000, loan and grant, for construction of complete sewage treatment plant for domestic and industrial wastes. Work can start in one month.

Shippensburg, Pa., \$150,000, loan and grant, for construction of masonry intake on Trout run and 11½ miles of 12-in. pipe from North Mountain to Shippensburg for water supply. Work can start at once.

Stainless Steel Now Produced by Armco

THE American Rolling Mill Co., Middletown, Ohio, has been producing corrosion-resisting steel sheets, strips and plates for many months for the account of the Rustless Iron Corp., according to a recent announcement. These products have been used in fabricating operations, and careful records of the performance under actual production conditions have been made. Performance under the dies is said to demonstrate unusual ductility and formability, both of which resulted in lower tool expense.

The steels are offered in two different grades, Armco 17 and Armco 18-8. The 17 grade is used for automobile and furnace parts, nitric acid and oil refining equipment and oil burner parts. The well-known 18-8, for some time popular with architects, is widely used for airplane parts, hotel equipment and beer barrels.

The Soviet Union reports that during the past 15 years rich copper deposits have been discovered at Kounrad on the north shore of Lake Balkhash in Kayakstan. This district contains about 60 per cent of the copper resources of the U.S.S.R., and, it is stated, the largest copper mining works and smelter in the world is under construction there.

San Francisco Considering \$35,000,000 Bond Issue

WASHINGTON, Oct. 17.—In a list of 29 non-Federal projects totaling \$13,871,000 for which allotments were announced last Friday by the Public Works Administration was a group of 13 projects for San Francisco for which grants aggregating \$7,895,700 were made, leaving 70 per cent of the cost, totaling \$35,189,460, to be met from local revenues. San Francisco is to hold a bond proposal election Nov. 7, to determine whether or not to approve the bond issue.

The largest single project is for extension of the water system for the city and county of San Francisco, to include additional bay crossing pipe line, Crystal Springs-University Mound pipe line, University Mound reservoir addition, Sunset reservoir and connecting pipe lines and an extension to the main pipe system. Grant of \$2,695,000; total cost, \$12,094,859. Work can be started in 60 days.

Other projects included in the San Francisco grants are:

Construction of 200,000-kw. hydro-electric plant in Tuolumne County and transmission and distribution system in Alameda, San Mateo and San Francisco Counties, grant of \$1,400,000; total cost, \$6,308,000. Work can begin in four months.

Increasing height of O'Shaughnessy dam by 85.5-ft.; grant of \$798,000; total cost, \$3,500,000. Work can begin in five months.

Construction of four-story and basement steel and reinforced concrete building for Hall of Justice; grant, \$666,000; total cost, \$2,900,000. Work can begin in 90 days.

Reconditioning of old sewers and construction of new sewers and sewage disposal plant; grant, \$545,000; total cost, \$2,625,000. Work can begin in 120 days.

Widening, straightening, surfacing and lighting 14 street projects in San Francisco; grant, \$464,000; total cost, \$2,100,000. Work can begin in 60 days.

Extension of high pressure mains of auxiliary water system and construction of additional underground system for fire protection; grant, \$460,000; total cost, \$2,000,000. Work can begin in 60 days.

Construction of livestock exposition buildings adjacent to San Francisco-San Mateo County line; grant, \$354,000; total cost, \$1,500,000. Work can begin in 60 days.

Extension of yacht harbor, Marine district; grant, \$203,000; total cost, \$815,000. Work can begin in 60 days.

Construction of boat houses, con-

crete wharf, bathhouse structure, etc.; grant, \$166,000; total cost, \$700,000.

Allotments to Other Districts

Further allotments included the following:

Columbus, Ohio, \$3,400,000, loan and grant, for construction of sewage treatment plant, activated sludge type. Work can start in one month.

Columbus, Ohio, \$1,800,000, loan and grant, for construction of approximately 11 miles of concrete and vitrified pipe sewers. Work can begin in one month.

Colorado Springs, Colo., \$285,000, grant, to aid in construction of 10 miles of 20-in. and 22-in. steel pressure line from storage reservoirs, including construction of two dams for municipal water supply. Total cost, \$1,250,000. Work can start in one month.

Brownsville, Texas, \$200,000, loan and grant, for rehabilitation and electric light plant, water works, city hall, fire stations and drainage system, damaged by hurricane Sept. 5. Work can start at once.

Standardization of Rail Joints Urged by Coordinator Eastman

WASHINGTON, Oct. 17.—Supplementing a previous communication, Federal Coordinator of Transportation Joseph B. Eastman last Saturday directed a statement to regional coordinating committees regarding the standardization of rail joints. Originally it was pointed out that the patent situation complicated standardization of rail joints and other accessories. In his latest statement, however, Mr. Eastman says it appears that there is an improvement upon which all are agreed and which can be adopted without delay, referring to the adoption of standards for hole diameters and spacing in rail ends.

He says that since his first communication, the Rail Committee of the American Railway Engineering Association has reached an agreement on standards for joint bars for the 131-lb. and 112-lb. standard rail sections. These standards will be recommended by the Rail Committee for adoption as A. R. A. standards under the usual procedure.

It was stated that in view of the present situation with regard to proposed purchases of rails and rail joints, it seems advisable to defer rec-

ommendations on the adoption of a single cross-section or joint bar, but to secure immediate adoption of the Rail Committee standards for hole diameters and spacing in rail ends. Mr. Eastman points out that on present information he believes that the number of existing different types of joint bars applicable to 131-lb. and 112-lb. rails is small and that delay in placing orders for joint bars will be avoided if no restriction is placed on the selection of bars to be used with rails now proposed to be purchased. It is to be understood, however, he says, that recommendations may be made in the future looking toward further reduction in the variety of joint bars. It was explained that such recommendations would be determined largely by the action of the A. R. A. in respect to standards developed by the Rail Committee.

End Hole Standards Recommended

Mr. Eastman recommended the immediate adoption by all railroads of the following standards for drilling the ends of 131-lb., and 112-lb. rails:

1. Holes to be 1 1/8-in. in diameter.
2. Center of first hole to be 2 1/2-in. from end of rail; center of second

hole to be 6½-in. from center of first hole; if third hole is used its center to be 6½-in. from center of second hole.

3. Height from base of rail to horizontal center line of holes to be:
 - (a) 3 3/32-in. for the 131-lb. rail.
 - (b) 2¾-in for the 112-lb. rail.

Mr. Eastman last Wednesday announced the appointment at his request by the Science Advisory Board of the National Research Council of a committee to study the matter of scientific research for the railroads. The

study will be made in conjunction with the railroad managements and the coordinator's organization. If it thereafter seems expedient, he says, a plan will be formulated for carrying on such research to assist in the initiation of the project. The Science Advisory Board was created by Executive order of President Roosevelt, one purpose being to avoid wastes and preventable expense. Among members of the committee of the Science Advisory Board is Dr. John Johnston, director of research, United States Steel Corp'n.

visions of said Section 4 from the basing point on which such base price is based to such place of delivery.

Additional Resolutions Approved

Maximum rates of discount and maximum periods of free credit on products shipped to the Pacific Coast from plants east of the Mississippi River are clarified in Commercial Resolution No. 25, approved as follows on Oct. 12:

Resolved that the board of directors hereby interprets and construes the provisions of Schedule G of the code with respect to maximum rates of discount for early payment and maximum periods of free credit in the case of products shipped from plants located east of the Mississippi River to Pacific Coast ports and which shall be invoiced from such plants as applying to such products which shall be shipped from such plants to or through any Pacific Coast port to any place of delivery in California, Oregon and Washington or in the Panama Canal Zone or Alaska and which shall be invoiced from such plants.

Pig Iron for Indirect Export

Arising from an inquiry for approximately 25,000 tons of cast iron pipe for Mexico City, Mexico, Commercial Resolution No. 26 provides allowances with respect to sales of pig iron for indirect export, as follows:

Resolved that, in order to enable manufacturers of pipe located in the United States to meet foreign competition in the sale of such pipe to the City of Mexico and pursuant to the provisions of Section 7 of Schedule E of the code, the board of directors hereby approves an allowance by members of the code from the price of pig iron that such members shall sell or contract to sell to any manufacturer of cast-iron pipe for the use of such manufacturer in the manufacture of such pipe for export to the City of Mexico in an amount which shall be no greater than shall be adequate in order to enable such manufacturer to meet foreign competitive conditions in the sale of such pipe to said city, such allowance to be promptly reported to the board of directors by the member of the code which shall have made it; *provided, however*, that no such allowance shall be made until the pipe manufactured from such pig iron shall have been shipped in such export trade and evidence that such pipe has been so shipped shall have been furnished to the member of the code making such allowance.

Conducts Research On Special Alloys

THE Globe Iron Co., Jackson, Ohio, has blown in its recently remodeled blast furnace, and is producing the usual grades of silvery iron, Bessemer ferrosilicon and special silicon manganese alloys. In addition, the company is carrying on extensive research in the production of other special alloys for the general trade which might be used in the manufacture of iron and steel castings.

Railroad Equipment

Louisiana & Arkansas is inquiring for three 2-8-2 type locomotives.

Beaver Valley Railroad has ordered one 30-ton 0-4-0 type gasoline locomotive from Plymouth Locomotive Works, Plymouth, Ohio.

Hillsboro & Northeastern has purchased one 35-ton 0-6-0 type gasoline locomotive from Plymouth Locomotive Works.

The Iron Age, October 19, 1933—49

Code Prices for Lower Michigan Steel Consumers Are Clarified by Institute

FURTHER clarification of finished steel price schedules in Detroit and lower Michigan has been accomplished by certain revisions in Commercial Resolution No. 13, approved by the directors of the American Iron and Steel Institute on Oct. 12. While the amended resolution leaves the major deductions in freight rates from delivered prices unchanged, said deductions are now made in cents per 100 lb. rather than in dollars per ton on all products except billets, slabs and blooms, which are ordinarily sold on a gross ton basis. Deductions of 20c. per 100 lb. are now allowed on cold-finished alloy steel bars for delivery to Michigan points taking a 31c. freight rate from Pittsburgh as well as to points taking a 29c. rate, and a 25c. deduction is allowable on cold-finished carbon steel bars, hot-rolled strip and hot-rolled, hot-rolled annealed and cold-rolled sheets to points taking a 29c. freight rate from Pittsburgh, as well as to points taking a 31c. rate.

The amended resolution follows:

Resolved that any member of the code may allow in respect of any of the products hereinafter specified which it shall sell or contract to sell for delivery to any purchaser at any of the places hereinafter described for the use of such purchaser a deduction from the then published base price of such member for such product not exceeding the respective amounts hereinafter specified:

(a) On blooms, billets and slabs (alloy and carbon steel) for delivery within the switching limits of Detroit, a deduction not exceeding an amount that shall be \$3 per gross ton less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of Section 4 of Schedule E of the code from the basing point on which such base price is based to said Detroit;

(b) On blooms, billets and slabs (alloy and carbon steel) for delivery at any place in Michigan outside the switching limits of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh, shall be not greater than 29c. per 100 lb., a deduction not exceeding an amount that shall be \$4 per gross ton less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(c) On alloy steel bars (hot-rolled

and cold-finished), and hot-rolled carbon steel bars (merchant and concrete reinforcing) for delivery within the switching limits of Detroit, a deduction not exceeding an amount that shall be 15c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to said Detroit;

(d) On hot-rolled alloy steel bars, and hot-rolled carbon steel bars (merchant and concrete reinforcing) for delivery at any place in Michigan outside the switching limits of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh shall be not greater than 29c. per 100 lb., a deduction not exceeding an amount that shall be 20c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(e) On cold-finished alloy steel bars for delivery at any place in Michigan outside the switching limits of Detroit to which the all-rail published tariff carload freight rate on steel bars from Pittsburgh shall be not greater than 31c. per 100 lb., a deduction not exceeding an amount that shall be 20c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery;

(f) On hot-rolled, hot-rolled annealed and cold-rolled sheets, hot-rolled strip steel and cold-finished carbon steel bars for delivery within the switching limits of Detroit, a deduction not exceeding an amount that shall be 20c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to said Detroit;

(g) On hot-rolled, hot-rolled annealed and cold-rolled sheets, hot-rolled strip steel and cold-finished carbon steel bars for delivery at any place in Michigan outside the switching limits of Detroit to which the all-rail published tariff carload freight rate thereon from Pittsburgh shall be not greater than 29c. per 100 lb., a deduction not exceeding an amount that shall be 25c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the provisions of said Section 4 from the basing point on which such base price is based to such place of delivery; and

(h) On cold-finished carbon steel bars for delivery at any place in Michigan outside the switching limits of Detroit to which the all-rail published tariff carload freight rate thereon from Pittsburgh shall be not greater than 31c. per 100 lb., a deduction not exceeding an amount that shall be 25c. per 100 lb. less than the all-rail published tariff carload freight charges otherwise chargeable thereon pursuant to the pro-

Labor Board Orders Weirton Strikers Back to Work; Union Will Not Be Recognized

PITTSBURGH, Oct. 17.—Striking employees of the Weirton Steel Co. were ordered by the Labor Board to go back to work, after a conference held in Washington between representatives of the board, Ernest T. Weir, chairman, National Steel Corp., and representatives of the strikers on Monday.

The strike, which has been in effect at the Weirton Steel Co.'s plants at Weirton and Clarksburg, W. Va., and at Steubenville, Ohio, since Sept. 24, was engineered by a minority of employees of the company who through threats to other employees forced the virtual closing of the works in order to avoid violence. A detailed account of the events leading to the strike was incorporated in a statement to employees made by E. T. Weir two weeks ago and published in *THE IRON AGE* of Oct. 5, p. 52.

The agreement was effected Monday of this week, under the offices of the Labor Board. The Board, which had assumed jurisdiction over the strikes at the Weirton operations, requested the presence of a representative of the Weirton Co., and Mr. Weir, in a spirit of cooperation with the President's Recovery Program, readily agreed to attend the hearing. In appearing before the Board, however, Mr. Weir stated emphatically that he was aware of no issues which he considered should be arbitrated, inasmuch as the company had been fully living up to the steel code agreement, that the strike was engineered by a minority of employees, that no demands had been filed by the strikers before the walkout and that the properly constituted committee elected by over 85 per cent of the employees for the purpose of collective bargaining was disregarded by the troublemaking minority.

The Board asked Mr. Weir if at the Weirton Co.'s next regular election for appointment of employees' representatives, which is scheduled for the second Monday in December, he would be willing to have representatives of the National Labor Board oversee the election. This proposal received Mr. Weir's unqualified approval. A five-point agreement, embodying the following provisions, was then consummated.

No. 1.—That the strike now pending be called off immediately.

No. 2.—The striking employees to be permitted to return to work without discrimination, prejudice or physical examination.

No. 3.—An election will be held during the second week of December under supervision of the National Labor Board, the procedure and method of election to be prescribed by the Board.

No. 4.—The employees shall be permitted as guaranteed by the provisions of Section 7A of the National Recovery Act to select representatives of their own choosing and the employers agree to bargain collectively with the representatives so elected.

No. 5.—In event that any dispute arises out of this agreement, it is agreed that the same shall be submitted to the National Labor Board for decision.

Open Shop Position Maintained

"The Company's long established position on the open shop and its refusal to deal with labor unions is absolutely maintained in every respect," said Mr. Weir in a statement made to *THE IRON AGE* on Tuesday, Oct. 17. His position in this matter is of particular interest to the steel industry, which is felt to be solidly in sympathy with his efforts to prevent an entering wedge being driven into an historically open-shop industry. It is also of great interest to the metal-working field as a whole, in which the same open shop background obtains. For this reason the full text of Mr. Weir's statement to the Labor Board follows:

I am appearing on behalf of the Weirton Steel Co. to make a statement of its position in the labor disturbance which has occurred at its plants. On Saturday I wired Senator Wagner that I would appear and make a statement. No complaint of any grievance has ever been made to us by anybody, and we have nothing to arbitrate. However, our respect for the members of this Board and our desire to cooperate in the President's Recovery Program impel me to make this statement of facts.

For 23 years it has been the practice of the Weirton Steel Co. to begin weekly operations in its tin mill at Weirton at 12.01 on Monday morning. There never has been any complaint about this practice. On Sunday, Sept. 24, without any warning to the company or without any notice or demand upon the company of any kind, 39 men, out of a total of 91 employed in the tin plate cold rolled department, failed to report for work at midnight. Subsequent investigation revealed that a group of three or four foreigners, stationed at the mill entrance, had persuaded these men not to come to work. The next two crews reported for work as usual. The following night the men who had remained away from work on the first shift Monday morning, entered the mill and demanded that the 52 men who had worked the night before be discharged because they had worked instead of remaining out with the other 39. This demand was refused by the foreman. These men then left work and later stationed themselves at the entrance to the mill and persuaded other employees not to report for work as the next turn came. About noon that day, William J. Long came to the office and asked the manager to meet with a committee of the Amalgamated Association

of Iron, Steel and Tin Workers, who would demand recognition of their union.

Employees Elected Representatives

In June, 1933, our employees adopted a plan of organization for collective bargaining and elected representatives to deal with the company in all matters of collective bargaining. Committees were selected from the various mills, in all totaling about 50 men. The committees were nominated and elected by secret ballot, in which over 85 per cent of our employees participated. These committees were recognized by the company and brought various matters to the attention of the management. One hundred eighty-one different matters have come up since the organization of these committees pertaining to wages, hours, and working conditions, and they have all received prompt attention and have been either adjusted satisfactorily to both parties or are still pending.

When Mr. Long made his request that we negotiate with the committee which he claimed to represent, he was advised that all collective bargaining for our employees would have to be conducted by the committees which our employees had chosen. Pickets were then organized and a group of about three hundred men gathered in a narrow street, blocked the main entrance to the tin mill as the four o'clock turn was coming to work and refused admission to employees. These tactics were continued until by Wednesday night, operations were so crippled that the entire plant was shut down. Even our superintendents and officials were denied admission to the mills by the strikers unless they presented passes issued by the strike leaders.

No Adequate Protection Provided

Committees of the strikers made tours of inspection of the mills and totally disregarded the rights of the company in every respect. This was made possible because the local authorities were unable to cope with the situation and there was no adequate protection of any kind.

Most of our employees did not know what the strike was about. There had been no dispute between the company and the men, no vote was taken by the employees as to whether or not they should strike, and no grievance of any kind was brought to us by the committees elected by the employees or any other person. Large numbers of our employees came to the management requesting an opportunity to work and stating that they were satisfied with the wages and working conditions and were anxious to resume their employment.

On Sept. 29, I addressed and mailed a letter to each of our employees, in which I stated: "Our duty under the NRA is clear. We must recognize the committees which have been selected and cannot be expected to negotiate with any other committee which happens to present itself. Under the NRA, our employees are free to select committees of their own choosing, whether made up of employees or not, but once the committees have been selected, we must recognize

(Concluded on Page 63)

Production Declines Sharply as Shipments Against Old Contracts are Completed

Steel Ingot Rate Off Five Points to 39 Per Cent of Capacity—Demand Generally Lighter with Many Consumers Covered for Immediate Requirements

WITH output definitely lower in all the principal producing districts and much lighter demand reported in leading consuming areas, the steel industry faces the remainder of the year with increasing pessimism. Manufacturing costs are still rising and steel makers are yet to benefit materially from increased selling prices under the code. The profits from such tonnage as it now comes in will almost certainly be pared down by decreased volume, and it is difficult to derive much encouragement from any angle of the current situation.

AS generally anticipated, steel ingot production this week reflects the completion on Oct. 15 of orders against third quarter contracts, and has declined five points to 39 per cent of capacity. In the preceding week, output had risen two points to 44 per cent. Losses ranging from three to 10 points are reported this week from practically all districts. Pittsburgh is off six points to 34 per cent; Chicago, three points to 45 per cent; Valleys and nearby northern Ohio, five points to 52 per cent; Philadelphia, seven points to 27 per cent; Cleveland, five points to 35 per cent; Buffalo, 10 points to 35 per cent, and Birmingham, eight points to 38 per cent.

Finishing mill schedules are also definitely lower, although tin plate production is holding at approximately 95 per cent of capacity. Sheet and strip mill operations are adversely influenced by declining automotive demand, while wire production has suffered from the absence of anticipated fall agricultural demand. Output of bars, plates and shapes is fairly well maintained by fourth quarter backlog tonnage, but releases are not in sufficient volume to sustain output much longer.

RAILROAD buying has practically disappeared from the market, presumably because of the efforts of the Government to establish lower steel prices by group purchasing. The rail makers have made no move to accept the rail tonnage offered two weeks ago at a substantial price reduction, and it is indicated that an increase rather than a reduction in the current \$40 a ton price would be more in keeping with steel making costs in the last quarter of the year. The Norfolk & Western has asked for bids on 10,000 tons of rails.

The construction industry is buoyed up by almost daily announcements of additional public works allotments, but these projects are not yet appearing in the form of structural steel inquiry, which amounts to only 6750 tons this week. Structural awards of 10,200 tons compare with 19,300 tons in the previous week. Locks and dams on the upper Mississippi River, for which plate and shape requirements of 25,000 tons have already been announced, will also take 40,000 tons of sheet steel piling. Bids on these dams will

be taken at the rate of one each week over the remainder of the year.

ALTHOUGH it is still likely that automobile production this month will total approximately 145,000 units, November and December schedules may be expected to decline sharply. In the bringing out of new models the industry is hampered by the tool and die makers' strike at Detroit, the introduction of radical changes in front wheel and spring construction and the uncertainty of 1934 production costs. Under the NRA code, labor charges alone have increased \$21 per car in the case of one large producer and materials prices are still advancing sharply as codification continues in the vending industries. Detroit consumers estimate that automobile steel is now \$10 a ton above the recent low average.

Demand for agricultural steel products has failed to develop. Farm buying power is being steadily reduced by declining grain prices coupled with rising quotations on products bought by the farmer, and producers of wire products, galvanized sheets, agricultural implements and other farm necessities report no buying interest in the rural regions.

THE recent precipitate decline in steel demand has again raised questions as to the size of consumers' inventories. It is reported at Detroit that the three leading automobile makers have accumulated 150,000 to 175,000 tons of finished steel which should be sufficient to complete production of present models. Many other manufacturing consumers are believed to have stocked steel rather heavily at recent low prices and jobbers have built up their inventories when the necessary funds were available.

On the other hand, the belief that consumers have overstocked is challenged by the fact that steel barrel makers, who were thought to have covered their future requirements rather heavily at low prices, are now entering the market in considerable volume.

LABOR troubles which have beset the industry in the last month have abated to some extent. The strike in the plants of the Weirton Steel Co. has been settled without recognition of the union and the terms of agreement may be expected to set a precedent for the rest of the industry.

Finished steel prices are unchanged, although further advances in pig iron quotations are contemplated in view of increased fuel costs. THE IRON AGE composite price for finished steel remains at 2.036c. a lb. for the third week, with the pig iron composite holding at \$16.61. Scrap prices are weaker in practically all districts and the composite has dropped from \$10.87 to \$10.54 a ton, reflecting a decline of \$1 a ton at Pittsburgh.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Oct. 17, 1933	Oct. 10, 1933	Sept. 19, 1933	Oct. 18, 1932
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$18.26	\$18.26	\$18.34	\$13.84
No. 2, Valley furnace.....	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti.....	18.13	18.13	18.23	13.82
No. 2, Birmingham.....	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.....	17.76	17.76	17.84	13.50
Basic, Valley furnace.....	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh.....	19.76	19.76	19.89	16.89
Malleable, Chicago*.....	17.50	17.50	17.50	15.50
Malleable, Valley.....	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago.....	23.54	23.54	23.67	23.17
Ferromanganese, seab'd car- lots.....	82.00	82.00	82.00	68.00

*The average switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel	Oct. 17, 1933	Oct. 10, 1933	Sept. 19, 1933	Oct. 18, 1932
<i>Per Lb. to Large Buyers:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.25	2.25	2.25	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.35	2.35	2.35	2.30
Sheets, galv., No. 24 P'gh....	2.85	2.85	2.85	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	2.95
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.65	1.55
Hot-rolled sheets, No. 10, Chi- cago dist. mill.....	1.85	1.85	1.75	1.65
Wire nails, Pittsburgh.....	2.10	2.10	2.10	1.95
Wire nails, Chicago dist. mill.	2.15	2.15	2.15	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill.	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh.....	2.60	2.60	2.60	2.60
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	2.65
Tin plate, 100 lb. box, P'gh...	4.65	4.65	4.65	4.75

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill.....	32.00	32.00	32.00	32.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.60	1.60	1.60	1.60

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$11.75	\$12.75	\$12.75	\$9.50
Heavy melting steel, Phila....	10.25	10.25	11.00	7.25
Heavy melting steel, Ch'go....	9.62½	9.62½	9.75	6.00
Carwheels, Chicago.....	10.00	10.00	10.00	7.00
Carwheels, Philadelphia.....	11.75	11.75	12.75	9.50
No. 1 cast, Pittsburgh.....	11.75	11.75	11.75	10.00
No. 1 cast, Philadelphia.....	11.50	11.50	12.50	9.50
No. 1 cast, Ch'go (net ton)...	10.00	10.00	10.00	6.25
No. 1 RR. wrot., Phila.....	11.00	11.00	12.00	7.50
No. 1 RR. wrot., Ch'go (net)...	8.50	8.50	8.50	4.50

Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.75	1.75	1.60	1.60
Bars, Chicago.....	1.80	1.80	1.65	1.70
Bars, Cleveland.....	1.80	1.80	1.65	1.65
Bars, New York.....	2.08	2.08	1.95	1.95
Tank plates, Pittsburgh.....	1.70	1.70	1.60	1.60
Tank plates, Chicago.....	1.75	1.75	1.65	1.70
Tank plates, New York.....	1.98	1.98	1.898	1.898
Structural shapes, Pittsburgh	1.70	1.70	1.60	1.60
Structural shapes, Chicago..	1.75	1.75	1.65	1.70
Structural shapes, New York.	1.95¼	1.95¼	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	1.70
Hot-rolled strips, Pittsburgh	1.75	1.75	1.65	1.45
Cold-rolled strips, Pittsburgh.	2.40	2.40	2.25	1.90

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.75	\$3.75	\$2.50	\$1.75
Foundry coke, prompt.....	4.25	4.25	3.25	2.75

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	7.50	8.50	8.75	6.00
Lake copper, New York.....	8.00	8.75	9.00	6.25
Tin (Straits), New York.....	66.75	48.37½	47.95	24.30
Zinc, East St. Louis.....	4.75	4.75	4.75	3.05
Zinc, New York.....	5.12	5.12	5.12	3.42
Lead, St. Louis.....	4.10	4.35	4.35	2.90
Lead, New York.....	4.25	4.50	4.50	3.00
Antimony (Asiatic), N. Y....	6.87½	6.87½	6.75	5.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Oct. 17, 1933	2.036c. a Lb.	\$16.61 a Gross Ton	\$10.54 a Gross Ton
One week ago	2.036c.	16.61	10.87
One month ago	1.979c.	16.71	11.17
One year ago	1.977c.	13.64	7.58
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.
	HIGH LOW	HIGH LOW	HIGH LOW
* 1933.....	2.036c., Oct. 3; 1.867c., Apr. 18	\$16.71, Aug. 29; \$13.56; Jan. 3	\$12.25, Aug. 8; \$6.75, Jan. 3
1932.....	1.977c., Oct. 4; 1.926c., Feb. 2	14.81, Jan. 5; 13.56, Dec. 6	8.50, Jan. 12; 6.42, July 5
1931.....	2.037c., Jan. 13; 1.945c., Dec. 29	15.90, Jan. 6; 14.79, Dec. 15	11.33, Jan. 6; 8.50, Dec. 29
1930.....	2.037c., Jan. 14; 2.018c., Dec. 9	18.21, Jan. 7; 15.90, Dec. 16	15.00, Feb. 18; 11.25, Dec. 9
1929.....	2.317c., April 2; 2.273c., Oct. 29	18.71, May 14; 18.21, Dec. 17	17.58, Jan. 29; 14.08, Dec. 3
1928.....	2.286c., Dec. 11; 2.217c., July 17	18.59, Nov. 27; 17.04, July 24	16.50, Dec. 31; 13.08, July 2
1927.....	2.402c., Jan. 4; 2.212c., Nov. 1	19.71, Jan. 4; 17.54, Nov. 1	15.25; Jan. 11; 13.08, Nov. 22

Pittsburgh District Ingot Production Is Off Sharply



Output in Valleys Is Also Down as Orders for Finished Steel Decline — Bolt and Rivet Prices Advanced — Scrap Lower

PITTSBURGH, Oct. 17.—With the depressing influence of labor complexities gradually lifting, the local steel industry is now in position to permit free play of its producing units. Most mills, however, are not momentarily pressed for shipments, having generally completed third quarter specifications by the deadline on Oct. 15. With new business very slim and backlogs consequently diminishing, rolling schedules are being revised downward. An exception to the general trend is the Weirton, W. Va., plant, which, following settlement of strikes today, will endeavor to resume normal activity by the end of this week in order to catch up on commitments against third quarter contracts.

Ingot output in the Pittsburgh district this week will average not more than 34 per cent, a loss of six points since last week. Production in the valleys and nearby northern Ohio mills is also lower at 52 per cent of capacity. Output in the Wheeling district will slowly increase during the week and will probably strike an average of 50 per cent.

General steel demand reflects hesitancy of consumers to cover for additional needs. In most cases, specifying against third quarter contracts was sufficiently heavy to preclude additional coverage until future business prospects line up more definitely. Fresh call for heavy hot-rolled steel products is largely restricted to Federal releases of public works projects. These jobs, however, have not thus far opened up enough demand for steel to provide real benefit to mills. Recent releases have been greater in number, but individual tonnage needs are insignificant. The automotive industry has not been able to expand its requirements of steel for next year's models, although a few orders for sheets at the full prices have been placed in the past week. Tin plate specifications continue heavy and most consumers are expected to specify maximum tonnage against old contracts. This situation will probably necessitate full engagement of tin plate mills practically through the year.

The Government proposed rail purchases are still pending. A growing resistance of rail makers to sharp re-

ductions in the rail price is apparent, although the final outcome of negotiations still is a matter of conjecture.

Practically all grades of scrap are nominally weaker, with No. 1 heavy melting steel \$1 a ton lower at \$11.50 to \$12. Coal prices have been established under the bituminous code, with drastic increases effected on slack. Higher prices on furnace and foundry coke are definitely established, although not much tonnage has moved in recent weeks.

Pig Iron

This market is listless. Basic consumers are apparently covered for their early requirements, and large lot buying that had been due for fourth quarter is evidently being generally deferred. Interest from the foundry trade is lacking. Merchant pig iron producers will eventually face sharply higher producing costs, largely as a result of rather precipitous price rises recently established on beehive furnace coke. Stocks of coke at active merchant stacks, however, are believed to have been expanded in anticipation of the increased coke prices, and reflection of higher fuel costs will probably not be an immediate factor. Sellers continue to quote unchanged prices at Sharpsville and Neville Island for fourth quarter tonnage.

Warehouse Business

Local warehouse distributors yesterday advanced prices on several steel items. Plates and structural shapes are now quoted at 3.05c. base per lb.; soft steel bars and small shapes, 2.85c.; hoops and bands, 3.10c.; blue annealed sheets, 2.85c., and floor plates, 4.80c. These prices are quoted f.o.b., Pittsburgh, delivered to customers' plants located within the free delivery zone. No changes have been made in quantity differentials.

Bolts, Nuts and Rivets

New price cards on these products will become effective Oct. 18. Machine and carriage bolt discounts will be lowered from 73 per cent to 70 per cent off list. Track bolts for the jobbing trade will also be discounted at 70 per cent off list. The base prices on large rivets will be advanced to \$2.75 per 100 lb., Pittsburgh or Cleveland, and to \$2.85, Chicago and Birmingham.

Discounts on rivets, 7/16-in. and smaller, will be decreased to 70 and 10 per cent off list. Galvanized bolts will be subject to 55 per cent discount. Stove and tire bolt discounts will be unchanged.

Semi-Finished Steel

Shipments of sheet bars last week were exceptionally brisk, while movement of other semi-finished steel products was quickened to a lesser degree as the result of accelerated mill schedules effected to meet the delivery deadline on Oct. 15 against third quarter contracts. Since mid-October, however, shipments have generally abated, and non-integrated mills are hesitant about specifying their forward requirements. Wire rods are in fair demand. Forging billets are quiet.

Bars, Plates and Shapes

Producers of these products are in fairly comfortable position so far as fourth quarter tonnage is concerned. Rolling schedules were naturally stepped up in the first half of October to meet the third quarter deadline on Oct. 15. Present backlogs are still of sufficient proportions to prevent a sharp scaling down of operations. Very little new business, however, has been booked since the beginning of the quarter. Demand from the automotive industry still is poor, with little prospect of betterment until changeovers to new models are more general.

Structural shapes and plates are barely supported by release of Federal work. A local mill has finally received formal award covering 11,200 tons of structural steel for bridges at Grand Island, N. Y. Another interest in this district has been favored with 1200 tons of structural shapes for locks at Winfield, W. Va. Other contracts recently placed specify minor tonnages. Projected river work on the Ohio and Mississippi Rivers offers the brightest hope for the immediate future of structural steel demand. The recent interest in plates for barge construction has evidently evaporated. A few barge projects are still pending, but tonnage requirements are relatively small. Reinforcing bars are quiet, with no important awards in this district having been reported in recent weeks.

Rails and Track Accessories

Although no official announcement has been made to reflect the attitude of rail makers toward the Federal coordinator's request for reduction in the rail price, at least one spokesman in the group has openly suggested that a cut in the present quotation is not justified when all factors are considered. The belief is growing that resistance to the Federal suggestions regarding price is stiffening, and that the rail makers are none too eager to reduce the rail quotation to \$35, despite the tempting tonnage in the offing. On Oct. 18 the Norfolk & Western will open bids on about 10,000 tons

of rails; this road has already taken bids on a supplementary tonnage of track accessories, which will probably be placed in conjunction with the prospective rail order. Otherwise the market is devoid of feature.

Wire Products

Sellers still are confused on certain code details relating to wire products. Considerable routine business is thus being retarded. Miscellaneous demand is considered fair, but volume is relatively light. Wire mills are fairly well engaged, but current operating schedules face recession if the volume of bookings fails to expand within the near future. Prices are unchanged for shipment through December.

Sheets

General completion of shipments against third quarter contracts on Oct. 15 has adversely affected sheet mill operations, which this week do not average much more than 40 per cent. The falling off in activity was brought about further by final rolling last week against the large Argentine export order for galvanized, booked by a leading mill in this district. Sheet demand for automotive consumption is relatively quiet, although some new business from that quarter offers encouragement of an early pick-up. Lack of dies has visibly retarded the change-over to new models. Sheet mills have begun to realize the new prices filed under the code, but the benefits of the higher returns have been offset largely by the reduced volume of business. Miscellaneous demand lacks feature.

Strip Steel

Unimportant carry-overs of third quarter tonnage beyond the Oct. 15 deadline will probably be completed by the end of this week. Motor car makers are not taking significant tonnages of strip, and miscellaneous demand accounts for the bulk of current spot bookings. Prices are well established at the new levels, which apply to shipments through fourth quarter.

Tubular Goods

Pipe mill operations continue to tend downward in the absence of support from any significant quarter. Small diameter products, such as locomotive boiler tubes and mechanical tubing, do not offer important tonnage. Line pipe is practically inert. Oil country goods are beginning to show signs of life, but recent tonnage received by local mills has been negligible.

Tin Plate

With the exception of a Weirton Steel Co. unit, tin plate mills are engaged at about 95 per cent of capacity. The unabated volume of specifications which continue to pour in is unquestionably sponsored by the desire of most consumers to take in as much tonnage as possible against low-priced contracts. Over-specifying

against contracts is not permissible under the code, and when full tonnage is taken out additional tonnage must submit to the present spot price of \$4.65.

Scrap

Scrap prices bid for recent railroad lists revealed definite ideas of lower values. The No. 1 heavy melting steel on the Pennsylvania Railroad list brought bids ranging from \$11.50 to \$12.25, while the same grade on the Baltimore & Ohio list brought \$12.15 delivered at a nearby mill. Prolonged absence of mill buying has further affected the price structure, and most grades are quotable at 50c. to \$1 under previous levels. In the absence of consumer sales, revisions are based on asking prices generally mentioned by dealers. No. 1 heavy melting steel is quotable at \$11.50 to \$12, with relative drops effective on railroad wrought, scrap rails and compressed sheets. Specialties are also nominally weaker. No. 1 cast and heavy breakable cast have resisted the gen-

eral move to lower ground. Shipments continue to be extremely sluggish, and no significant change from the present dull character of the scrap market is definitely in sight. The down trend in mill operations is a prominent factor in forestalling important buying.

Coal and Coke

Minimum prices on coal and coke, reflecting sharply higher levels, became effective Oct. 16. The most significant rise is recorded on western Pennsylvania steam slack, which has been boosted from a range of 85c. to \$1, to \$1.30, to \$1.40, mines. A relative advance has been instituted on gas slack. Connellsville furnace coke is quoted at \$3.75, ovens, with very little tonnage available. Premium brands of foundry coke are now quotable at \$5.25 on track, and \$5.75 for spot shipment, with some sellers claiming even higher prices. Standard Connellsville foundry coke is available at a minimum of \$4.25, ovens.

Valley Output Declines as Shipments Against Old Contracts are Completed

YOUNGSTOWN, Oct. 17.—General freedom from labor difficulties enabled steel mills in this district to complete shipments against practically all of their third quarter commitments by the deadline on Oct. 15. With fresh tonnage being specified rather stintingly, order books do not provide enough tonnage to sustain the recent operating schedules. Since the mid-month, a number of open-hearths have been taken off, and current operations do not average more than 50 to 52 per cent.

Backlogs are now generally restricted to fourth quarter bookings of bars, plates and shapes placed prior to the recent price advances. Forward commitments of sheets also are small. The lag in specifications from the automotive industry, which is beset by its own labor troubles, is beginning to be felt. Tin plate specifications still are relatively heavy, and little change from present near-capacity operations at tin plate mills is expected for another month. Movement of semi-finished steel has abated. Sheet bar mills have been recently producing heavily against the lively demand from tin plate units and sheet mills, but are now caught up with the demand and have scaled down operations.

Pipe mills are not particularly busy. Demand for oil country goods is contributing to present activities. The need for drill pipe and casing seems to be increasing. Line pipe, however, has not reflected any encouraging tendencies in the past month. Standard pipe is relatively sluggish

in the absence of important construction, particularly in the private class.

In reviewing future prospects for the local industry, executives here cannot discern any assured significant outlets for steel. Federal work, of course, continues to be the chief reliance of local mills. The prospective railroad buying program fails to provide Valley producers with much encouragement because of its special features. Unless the program be expanded to include equipment buying, which can be translated into a diversified demand for steel, mills here will not be benefited measurably except possibly in the case of track accessories. A slum clearance program at Youngstown, for which a Federal loan of \$3,000,000 is proposed, will, if it materializes, open up a substantial need for capital goods, including heavy rolled steel.

Scarcely a ripple of activity has been noticeable in the prime materials markets in recent weeks. Pig iron sellers are concerned chiefly with procuring full specifications against all old contracts, which must be completed by Dec. 31.

Fuel markets have not shaken off the uncertainty of strikes, but there is a noticeable relief from the recent tension. Steam coal is in evidence, although the demand for that grade still is met chiefly by Ohio mines, which have not been influenced by strikes. Furnace coke and foundry coke are being quoted at sharply higher prices, while domestic coke is up 50c. a ton.

Demand and Production Lower in Chicago Area



Steel Ingot Output Declines to 45 Per Cent—Little Farm Buying in Prospect—Railroad Purchases Absent

CHICAGO, Oct. 17.—New specifications for finished steel are off sharply and ingot output has fallen three points to 45 per cent of capacity. Sellers look upon the situation as one that would naturally follow the rush prior to Oct. 15. For some time it has been generally acknowledged that shipments offered no gage as to actual consumptive requirements. But steel producers still are not willing to admit that the movement was highly speculative but rather represented the acceptance of tonnage that buyers will consume in the near future.

Most sellers are of the opinion that the present lull is only temporary and that November will see improvement. This viewpoint is no doubt based upon the manufacture of new model automobiles, which most companies plan to introduce before the national shows, and the everlasting hope that railroad buying of rails and equipment will materialize this fall.

Structural work is confined almost wholly to dams and locks on the Mississippi River and the various bridge programs of western States. Road programs are lagging, and with cold weather near at hand, few orders for reinforcing bars used for road slabs can be anticipated this fall. The scrap market clearly reflects the general situation. Prices are nominal but have a distinct tendency to seek lower levels. Brokers' pressure for sales to steel mills is meeting with complete indifference.

Pig Iron

New buying of northern foundry iron is dull and specifications are lower than the September average. Southern iron is moving into this territory in small quantities at the 38c. differential under the delivered price of northern iron. Fourth quarter contracts for ferromanganese are being signed at prices that do not vary from third quarter quotations.

Reinforcing Bars

This market is enlivened by Federal loans which permit construction on two old projects the bars for which were purchased over a year ago. One of these projects is for the Sanitary District, which will release 3500 tons and the other is the nurses' home at the Cook County Hospital which re-

leases 800 tons. Six housing plans are being contemplated for Chicago, one such project requiring 500 tons of bars. Steel has been ordered for the Alma, Wis., dam and the needs for two similar dams will be purchased this month. About 5000 tons of reinforcing bars will be used in 12 additional dams that will be constructed in the upper Mississippi River.

Cast Iron Pipe

Business has improved rather sharply in the last week, especially in the number of small orders. Also encouraging is the fact that public utilities, long out of the market, have placed a few small orders. The Sanitary District, Chicago, has obtained a loan of \$8,000,000, and, in addition to completing old contracts, will buy some additional tonnage of cast iron pipe. Special fittings and some pipe will be used in filter plants at Hammond, Ind., Milwaukee, and Springfield, Ill., Federal funds now being available for construction at the latter place.

Rails and Track Supplies

Actual transactions in this market are confined to miscellaneous orders for track accessories, which are wanted on short deliveries, and a few releases of rails against old commitments. Current rail releases are sufficient to give local mills small but steady rolling schedules. The contemplated rail buying program has made little or no progress insofar as current indications are concerned. Mills frankly acknowledge that the tonnage is attractive, but reducing prices is another matter.

Wire Products

Output has dropped about five points to 45 per cent of capacity at a time when most sellers had fully anticipated that demand would be heavier. It had been expected that requirements for automobiles would be retarded when it became generally known that many innovations were to come in the new models that will be offered this fall. However, too much credit had been given to the farm relief measure which is back-firing as far as retail sales to farmers are concerned. Cattle and grain prices have fallen rapidly, and, although farm products are still well above their extreme lows, retail prices continually

reach new highs and the farmer feels that any advantage he has gained in his own markets is more than wiped out when he goes to buy. Wire sellers are far less certain of a fall revival than they were a week ago.

Sheets

Local mills are still at close to capacity, but the character of demand is switching from mixed grades to cold-rolled products. Shipments to automobile manufacturers are still in good volume. This movement is not wholly on the basis of consumptive requirements, but is also for storage which is a new departure for this industry. Little thought is being given to the base price structure but producers admit that extras need study with a view to still greater co-ordination. Sheets are moving to farm areas in very light volume.

Plates

This market after getting under way a week ago, has again turned dull. The Graver Tank & Mfg. Corp. has taken a number of orders amounting to 1000 tons. Mills report that current business is reaching them in fairly numerous but small lots. Fully 40,000 tons of steel piling will be needed for the upper Mississippi River dams which will come out for figures at the rate of one a week during the remainder of this year.

Structural Shapes

Outstanding in this week's business is 2500 tons for the dam across the Mississippi River at Alma, Wis. Other awards, all of which are for highway bridges, total 2500 tons. Fresh inquiries are for 2500 tons, not counting a revived project for 5000 tons for a municipal auditorium at Kansas City. Bids are being taken on locks at Quincy, Ill., and other dam and lock projects along the upper Mississippi River, which will come out for figures during the remainder of the year.

Bars

Specifications for bars are maintained far better than releases for other finished steel products. A new alignment in the bar market is bound to follow wide adoption of individually suspended front wheels on automobiles. This practice will eliminate the front axle which is usually forged from bar sizes. Nash and Studebaker are well engaged in the production of 1934 models.

Scrap

Demand for scrap remains dull and brokers are inclined to believe that any sale is a good sale, thereby indicating that prices may go lower. They are giving close attention to mill operations and have already noted that the moderate upward climb of recent weeks is at an end. One mill is holding up all orders, and shipments are being restricted in other directions. Movement of foundry grades is slow. The only list being offered by a Western carrier is that of the Milwaukee Road.

Sharp Decline in Eastern Pennsylvania Steel Rate



Demand for Heavy Hot-rolled Products Extremely Light With Sheets More Active—Large Export Inquiry for Cast Pipe

PHILADELPHIA, Oct. 17.—Sagging further, the market for steel has narrowed, except in the case of sheets. A mild improvement in both automotive body and enameled sheets is reported, but demand for the heavier lines, including plates, shapes and bars, is extremely dull. Some makers of these products report that new business is as light, if not lighter, than in any previous period of the entire depression. This is accounted for largely by the almost total absence of railroad buying. Backlogs are being reduced rather rapidly at mills and open-hearth operations have fallen off seven points to 27 per cent of capacity. The first of the season's Pennsylvania highway contracts will be awarded on Oct. 19, and will call for 400 to 500 tons of reinforcing bars.

Because of increased fuel costs, blast furnace operators are said to be considering an advance of \$1 per ton in pig iron.

Pig Iron

The foundry melt is holding up fairly well. Increased inquiries for pig iron are coming from this source, but tonnages involved are small. Requirements for steelmaking iron are light. The City of Mexico is expected to place an order soon in the United States for 25,000 tons of cast iron pipe, which will require about 20,000 tons of foundry iron. Strikes have increased fuel costs and it is reported that another increase of \$1 per ton is being considered by blast furnace interests.

Plates, Shapes and Bars

Most makers report that new business is stagnant and is at as low a point as in any period during the entire depression. The let-down has followed the recent contracting at third quarter levels. It is reported that the Baltimore & Ohio has contracted for a tonnage of its car repair program. The quantity is said to have been comparatively light. The contracts are said to have been placed on a percentage basis. Estimates are that the total will be about 1000 tons. Reports that the Northern Pacific Railroad has contracted for 12 large passenger locomotives are said to be erroneous. Steel makers have been asked by locomotive builders for bids which will go

in a day or so. They will involve about 500 tons of boiler plate steel. The State of Pennsylvania is asking for bids each week in connection with its roadbuilding program, for which the Federal Government has allotted \$18,000,000. On Oct. 19 it will let contracts for 400 to 500 tons of reinforcing bars. The Wark Co., Philadelphia, has been awarded the general contract for the housing development program of the Hillcrest Homes Corp., to be undertaken through a Federal loan of \$1,250,000 and the company's own capital.

Sheets

Business has let down but some makers report that current orders are fair, showing a mild improve-

Steel Ingot Output Declines at Buffalo

BUFFALO, Oct. 17.—After rising to six active furnaces, the Lackawanna plant of the Bethlehem Steel Corp., late last week went back to four open-hearths, and is continuing this rate of operation. Republic Steel Corp. went down to four furnaces over the week-end, but increased this to five, its large furnace being out for repairs. Wickwire-Spencer Corp. continues to operate two furnaces and Seneca sheet division of Bethlehem is operating about 60 to 65 per cent. No sizable awards of fabricated structural or reinforcing bars are reported, although a few small brewery jobs testify to the continued activity of this industry.

Pig Iron

Pig iron buying is light with most melters covered for their immediate needs. The General Electric Co. has an inquiry out for 800 tons of high silicon foundry for one of its New York State plants. So far as is known, the 1000-ton lot mentioned last week has not been placed. Operations remain unchanged.

Scrap

The scrap market is marking time. There have been small sales of No. 1 and No. 2 heavy melting steel, but the tonnages were not large and the quo-

ment in the past week. Others report a falling off in demand. Automotive body builders are taking moderate tonnages. Some of these requirements are to supplement stocks on hand and are for use on both old and new model bodies. Fair sized requirements also have been placed by makers of boilers, radios, commercial refrigerators, signs and stoves, the three latter groups taking enameled grades.

Warehouse Business

Hot-rolled annealed sheets have been advanced \$2 and galvanized sheets \$5 per ton by jobbers, effective Oct. 11. Demand has shown a slight improvement and comes from miscellaneous sources.

Imports

The following iron and steel imports were received here last week: 4046 tons of pig iron from the Netherlands; 295 tons of iron ore from Spain; 65 tons of structural shapes, 11 tons of diamond plates and 3 tons of steel bands from Belgium; 22 tons of structural shapes from Germany and 13 tons of drill steel from Norway.

Scrap

Mills have practically withdrawn from the market and appear to be well covered for some time at existing operating rates.

tations were obviously of a distress nature. Tonnage dealers are asking \$10 for No. 1 and \$9 for No. 2 steel. Small sales of stove plate are reported at \$9.25.

Pig Iron Shipments Holding at Birmingham

BIRMINGHAM, Oct. 17.—The pig iron market is without feature. Shipments of two producers in the first half of October were slightly ahead of the September period. The third producer did not keep pace with last month. Part of the current movement is thought to be for stocks, and is drawn against old low price contracts. Forward buying is limited and most sales are for prompt shipment. Stove plants continue to be the chief support of the market, but their operations have receded somewhat in the last few weeks. The base price is still \$13.50. Woodward Iron Co. banked its No. 3 furnace last Friday, leaving that company with one active stack. The change reduced the number of operating furnaces in the district to seven.

Steel

The steel market is quiet with bookings comparatively small. Shipments prior to Oct. 15 were fair because of the time limit on third quarter specifications. Eleven open-hearth units were worked last week. Schedules for this week call for a reduction to nine.

Orders Decline and Ingot Rate Falls at Cleveland



Steel Production This Week at 35 Per Cent of Capacity—Barrel Makers Ordering Steel More Freely—Scrap Weaker

CLEVELAND, Oct. 17.—Mills have about completed shipments of finished steel against third quarter contracts and little new tonnage is coming out. While some producers were unable to deliver all the sheets and strip steel purchased at the old prices before the deadline date, Oct. 15, practically all of this steel was rolled by that time and shipped out early this week. With old orders filled and the new demand quite limited, ingot output in the Cleveland-Lorain territory declined five points this week to 35 per cent of capacity. Three local open-hearth furnaces went out and one was put on, but only for short time operation in Lorain, where a blast furnace now banked will be active for a few days and then blown out.

Some orders are being taken at the new prices but nearly all are for small lots from miscellaneous sources. The steel barrel industry, which has become fairly active, has placed additional sheet tonnage and car repair work is bringing out some orders for small lots of bars, plates and shapes. Many sheet and strip consumers have good stocks taken at the old prices and their new orders are limited to small lots to fill in. New demand from the automotive industry is very light. The steel industry is feeling the effects of the tool and die strike in the Michigan territory, as the delay in bringing out new models of automobiles is resulting in the holding back of steel orders. However, local stamping plants have received quite a few inquiries from the automobile manufacturers for quotations on parts for new models.

Increased production costs have resulted in price advances of about 11 per cent on bolts and nuts and \$5 a ton on large rivets for the remainder of the fourth quarter. Cleveland jobbers have made an upward revision in prices to conform with the new mill price schedules. Under the new schedules there will be one set of prices for local delivery and another confined to products not having a Cleveland basing point, for outside shipment. The latter prices will be based on Pittsburgh prices.

Pig Iron

New demand is very light and limited to small lots for prompt delivery. Consumers are following a very cautious policy and are not buying for

future delivery because they wish to avoid making commitments for iron that they would have to take or be penalized for cancellation under the terms of the code. Shipments are still below September volume. Jobbing foundries in the northern Ohio territory are operating fairly well and are taking shipments at recent rate, but restricted shipping orders from automobile foundries indicate that they are not very busy on castings for new models. While the Ford Motor Co. has made tentative inquiry for 10,000 tons of basic iron it has not yet definitely decided whether to buy this iron.

Iron Ore

Consumption of Lake Superior ore during September amounted to 2,102,076 tons, a decline of 509,827 tons from August, and compared with 697,185 tons in September last year. Furnace stocks Oct. 1 amounted to 28,015,502 tons and stocks at furnaces and Lake Erie docks were 33,449,075 tons, as against 32,323,528 tons on the same date a year ago. There were 81 furnaces in blast using lake ore Sept. 30, a loss of 8 for the month. Several of the Lake Superior Iron Ore mining interests will resume operations in their underground mines Nov. 1 to give part time employment to their miners. Stocks at these mines have been largely reduced during the shipping season.

Sheets

New demand is light, although steel barrel manufacturers placed some good tonnage during the week, the business going at the new prices. While several of the barrel manufacturers stocked heavily before the price advance, others accumulated little stock. The recent improvement in steel barrel business is being maintained. Most new sheet orders are small and are for rounding out stocks. Following the recent spurt in business from the motor car industry has dwindled to a low point. Delay in bringing out new models because of the Michigan strike is blamed for the absence of round tonnage orders from motor car manufacturers.

Strip Steel

Sales are light and limited to small lot orders, which are being taken at 1.75c., Pittsburgh, for hot-rolled strip

and 2.40c., Cleveland, for cold-rolled material. Very little business is coming from the motor car industry.

Warehouse Prices

Advances of from \$3 to \$10.20 a ton have been made in new prices announced by Cleveland warehouses, effective Oct. 16. Under a new system of basing prices of products not having a Cleveland basing point are now based on the Pittsburgh price plus freight rate and jobbers' differential. For steel bars having a Cleveland basing point a transfer charge of \$2 a ton for deliveries is included in the price. New warehouse differentials are \$1 per 100 lb. for bars and blue annealed sheets and \$1.25 for other items. The differential for high-carbon special forging steel is established at \$6 a ton, an advance of \$1. Cold-finished bars and cold-rolled strip are unchanged.

Bolts, Nuts and Rivets

Effective Oct. 16, bolt, nut and rivet manufacturers advanced prices for the remainder of the last quarter. Machine and carriage bolts and nuts were marked up three points from 73 to 70 per cent off list. Step and elevator bolts were advanced from 70 per cent to 66 per cent off list and hot-galvanized bolts from 65 per cent to 55 per cent off list. Stove bolts and cap and set screws are unchanged. Large rivets were advanced \$5 a ton to \$2.75 per 100 lb., Pittsburgh and Cleveland, and to \$2.85, Chicago and Birmingham, and small rivets were marked up to 70 and 10 per cent off list from 70, 10 and 5. The prices that have prevailed were quoted for October shipment only as manufacturers, due to uncertainty about costs, were unwilling to make commitments for the remainder of the year. Many of the larger bolt and nut buyers covered for October at the old prices and will be permitted to specify against these contracts until the end of the month.

Bars, Plates and Shapes

While some small lot sales are being made at the new prices most consumers are under contract for the quarter. Specifications are light. An encouraging sign in the construction industry is an increase in inquiry for steel for small additions to industrial plants. Ohio will take bids Oct. 27 on a new list of highway lettings which include only 100 tons of structural steel for bridge work. Several other State bridge jobs are still pending. Steel bars are quoted at 1.80c., Cleveland, and plates and shapes at 1.70c., Pittsburgh.

Scrap

The market continues inactive and has a weak tone. Heavy-melting steel has declined 25c. a ton. A local consumer is taking only heavy-melting scrap and that in restricted quantities, and little is being shipped to Youngstown district mills.

Finished Steel Orders Lag in New York Consuming Area



Rush Orders for Some Products Indicate Hand-to-Mouth Buying Still in Evidence—Pig Iron More Active — Scrap Weaker

NEW YORK, Oct. 17.—Finished steel demand in this district continues to lag, although the October tonnage of a few companies compares favorably with the August and September averages. It now appears that many steel consumers stocked sufficient material at the end of the third quarter to take care of their requirements for several weeks, but insistence upon rush shipment by other buyers indicates that many small users of steel have not departed from a hand-to-mouth buying policy.

Practically all finished steel products reflect the recent declining tendency. Specifications for tin plate are fairly good but considerably under late-summer levels. Sheets and strip steel are particularly quiet. Demand for bars is well distributed but not large. Substantial orders for plates and shapes are still held in abeyance awaiting the completion of local and State plans which necessarily follow the allocation of Federal funds. Buying by the railroads is negligible. The rail producers have not yet indicated their acceptance or rejection of the Federal coordinator's offer of substantial rail tonnages at a large price reduction. Belief is growing that the rail makers cannot accept this business at the figure suggested.

No significant price changes on finished steel products have been filed with the American Iron and Steel Institute and it now seems likely that the present setup will remain effective for the rest of the quarter.

Pig Iron

Local sellers report slightly improved consumer interest. Sales are confined mostly to spot carlots, although some tonnage is for December delivery. Bookings for the week approximated 4000 tons, compared with 2700 tons last week and 2800 tons in the preceding period. Inquiry is principally for lots under 300 tons, but aggregate business before the trade is greater than it has been for the past month. Current foundry purchasing is generally determined by the weekly melting schedule, as it is generally assumed that the 10-day notification of a price change is ample protection against a rise in quotations. Releases against old contracts are undiminished. Furnace representatives welcome the recent insti-

tute ruling which established phosphorus content of malleable grades ten points higher at 0.30.

Reinforcing Steel

Sellers anticipate improved winter activity in this district, since the projected Governmental post office building program is expected to mature within the near future. Present business is almost entirely limited to road mesh awards, but despite the negligible demand for bars, prices are firm at 1.80c., Pittsburgh, for stock length billet bars and 1.75c. a lb. for rail steel. Awards for the past week

Cincinnati Pig Iron Demand Very Light

CINCINNATI, Oct. 17.—Although a better feeling pervades the pig iron market, there is no tangible foundation for the optimism. Consumers are not interested in future requirements, and inquiry is totally absent. The absence of buying is largely due to the spurt of speculative purchasing a month ago, which has placed most melters in good position so far as inventories are concerned. New business last week totalled about 350 tons, all of which was in single carlots. Foundry operations are extremely spotty. Some stove foundries and a few jobbing plants are operating at a fair rate. Uncertainty about the foundry code is causing some hesitancy in the trade, but the feeling exists that after the code is signed, the resulting stabilization of prices will stimulate business. Shipments against contracts are still good, and furnaces are rapidly catching up with commitments.

Coke

The stiffening of coke prices has given the market a stronger undertone despite the absence of appreciable business. Domestic grades, on which quotations have been advanced 50 cents a ton, are responding to the usual seasonal stimulus.

Steel

Demand for sheets reacted to the prevalence of strikes in many of the consuming industries, particularly in the automotive field. Even on the spec-

ulated 225 tons of mesh. New York, New Jersey and Connecticut early next week will open bids on highway requirements aggregating about 1000 tons. No action is expected until early spring on the 3500 tons of miscellaneous steel required by a bridge replacement program in Erie County, N. Y.

Scrap

Brokers estimate export loadings to be approximately 50 per cent completed. Current foreign activity is somewhat hampered by the difficulty in securing boats and the unfavorable exchange rates now prevailing in Japan, Italy and Poland. Brokers' prices on heavy melting grades are quotably unchanged, but in sympathy with outside weakness it is expected that No. 1 and No. 2 will decline to \$7.50 and \$6.50 a ton, respectively, before the end of the week. All other grades are decidedly inactive, and listings are considered nominal. Domestic mills, which draw from this district, continue to evince no interest in fresh commitments nor are releases being made on old contracts. It is estimated that mill scrap stocks have been considerably depleted in the last three weeks.

ulative tonnages placed before effective date of the code prices, consumers are requesting lighter shipments because of the uncertainty developed by labor troubles. Bookings, the past week, were below 50 per cent of capacity output and rolling schedules have been set for this week on a parity with demand.

Scrap

Further weakening of old materials is reflected in 25c. reductions of dealers' bids on heavy melting steel and stove scrap. Material is available in good quantity, but dealers are without sufficient business to absorb the supply. Small amounts of scrap are moving on what few old commitments are still on the books, but mills are refusing new contracts.

New England Scrap Market More Active

BOSTON, Oct. 17.—The scrap market is more active in this district. The American Steel & Wire Co. is again buying No. 1 steel at around \$8 a ton delivered, and No. 2 steel and bundled skeleton at \$7, bringing the local on cars price down to about \$6.60 and \$5.60 a ton respectively. Further sales of cotton ties at \$5.25 and \$5 a ton, on cars shipping point, for Pennsylvania consumption are reported, and steel turnings have been bought at \$2.75 to \$3. A few lots of shafting has been moved at \$9.50 a ton, on cars shipping point, and chemical borings for New Jersey consump-

tion have been bought at \$7.50 to \$8. Owners of scrap, however, are reluctant to sell at prevailing quotations.

The pig iron market is rather flat, sales the past week aggregating but a few hundred tons, most of which was for mixture purposes. A 500 to 1000-ton inquiry, released a fortnight ago, remains uncovered. The melter has sufficient iron for 1933, but had in mind a possible advance in price. No other prospective business of importance is before the trade, although one furnace representative hopes to close two round tonnages this week.

Lettings of fabricated structural steel are confined almost entirely to small individual tonnages, but indications are that some large lots will be placed within a month. Reinforcing bar distributors have just had the best week in many months, with sellers holding to schedule prices in practically all cases.

Cast Iron Pipe

Providence, R. I., has awarded 6000 tons to R. D. Wood & Co.

Richford, Vt., has awarded 600 tons to R. D. Wood & Co.

Townsend, Mass., closes bids Oct. 20 on 58,000 ft. of 6 to 12-in.

Quincy, Mass., has closed bids on 170 tons.

Lincoln Park, N. J., plans pipe line for water supply. Entire project will cost about \$200,000. Clyde Potts, 30 Church Street, New York, is consulting engineer.

Danville, Ky., plans 20-in. water line from Herrington Lake to city, about 3½ miles. Cost over \$85,000. Ralph Wyatt, city engineer.

Cleveland has secured Federal loan of \$800,000 for new water supply lines.

Purchasing and Contracting Officer, Quartermaster Corps, Fort George, G. Meade, Md., asks bids until Oct. 27 for 12,760 ft. of 6 to 12-in. for water system; also for gate valves, bends, tees, etc. (Circular 13).

Sanitary District, Chicago, has obtained an \$8,000,000 loan from Government and will proceed with work, most of which has been placed under contract.

Springfield, Ill., will build a filter plant with loan of \$3,000,000 obtained from Government.

Eau Claire, Wis., has purchased 1800 tons of pipe from James B. Clow & Sons.

Fairview, Mont., will require about 21,700 ft. of 4 to 8-in. for water supply system. Cost \$47,000. Financing will soon be arranged. Roy N. Stewart, Miles City, Mont., is engineer.

Morgan Hill, Cal., plans extensions and improvements in water supply system, requiring about 34,000 ft. Cost \$45,000. C. C. Kennedy, Call Building, San Francisco, is consulting engineer.

Los Angeles will open bids Oct. 19 on about 3500 tons.

Aberdeen, Wash., will open bids Oct. 20 on 650 tons.

Mound, Minn., will open bids Oct. 20 on 400 tons.

Honolulu, T. H., Board of Water Supply plans pipe lines for water supply. Federal loan of \$160,000 has been secured for this and new reservoir.

General Purchasing Officer, Panama Canal, Washington, asks bids until Oct. 31 for quantity of cast-iron pipe (Schedule 2912).

Pig Iron Buying Is Light at St. Louis

ST. LOUIS, Oct. 17.—Buying of pig iron has been light during the last few weeks, although shipments against contracts are being well maintained. Melters still are imbued with a spirit of conservatism in their commitments for raw materials, and the extent of their buying during the remainder of 1933 depends entirely upon the size of their order files. Northern and Southern basic iron continues on the same delivered basis, with the delivered price on the latter make of foundry iron 38c. a ton less than the former.

Steel

The Granite City Steel Co. has reduced its St. Louis delivered prices on sheets and plates 2c. per 100 lb., due to the removal of the freight surcharge. Shipments have held up well at this plant. The taking of bids for the Municipal Auditorium in Kansas City, requiring 6000 tons of structural steel, which was postponed from Oct. 4, has been definitely set for Nov. 6.

The scrap market is quiet and prices are unchanged. Mills in the district are marking time as far as purchases are concerned, and so are the dealers. The Missouri Pacific list of 85 carloads was sold during the week, most of the scrap going to Colorado consumers.

Pacific Coast Federal Projects To Go Ahead

SAN FRANCISCO, Oct. 16.—Bids have been asked on several major projects which have been pending for several months. Work on the Federal building at San Francisco is to go ahead with bids to be taken Nov. 7. This structure will require approximately 4000 tons of structural steel and 700 tons of reinforcing bars. The Navy repair basin at Pearl Harbor, Hawaii, is to be completed under contract for which bids are being taken Nov. 15. The pier and quay wall will require a minimum of 2400 tons of reinforcing bars and a smaller tonnage of cast iron pipe. Los Angeles County is making application to the National Recovery Administration for a loan of \$2,820,000 to be used for the construction of the White Point Outfall sewer for which approximately 3000 tons of cast iron pipe and 1700 tons of reinforcing bars will be required.

Steel lettings continue to be confined largely to highway work. An aggregate of 1410 tons of structural steel and 1478 tons of reinforcing bars have been booked. At Santa Barbara, Cal., 1000 tons of structural steel for the Pacific Western Oil Co. pier was placed with foreign mills.

New warehouse schedules issued

the first of the week at San Francisco showed a strong increase in steel prices. It is reported that Los Angeles and Seattle have not followed the advance.

Large Purchase of Scrap at Detroit

DETROIT, Oct. 17.—The local scrap market has been enlivened by purchase of 25,000 tons by the local steel plant, but movement of material to other steel producing districts is virtually at a standstill. Prices of steel items are off 25c. to 50c. a ton. Dealers are anticipating a further decline in prices as operations of steel mills supplying the automotive trade drop off.

Canada Reports Decline In Copper Production

FINALLY revised statistics on the production of primary copper in Canada, as reported by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa, show a production in 1932 of 247,679,070 lb. of copper valued at \$15,294,058, as compared with 292,304,390 lb. worth \$24,114,065 in 1931 and 303,478,356 lb., at \$37,948,359 in 1930.

Uniform Extras Are Published by Institute

IN accordance with Section 7, Schedule E, of the code of fair competition, the American Iron and Steel Institute has published a booklet of uniform extras and deductions for products of the iron and steel industry. The booklet is in loose-leaf form and is classified according to products into 70 sections which may be removed and used according to the requirements of salesmen, buyers and other interested parties. The booklets have been distributed to members of the institute and additional copies may be obtained from the institute at 50c. each.

Pipe Lines

Charlottesville, Va., plans steel pipe line on Meade Avenue for gas. Work will be carried out in connection with municipal improvements to cost \$66,000.

City and County of San Francisco plans installation of quantity of steel pipe for extensions to main water supply system. Entire project will cost \$12,094,000. Federal loan is being arranged.

Indiana Gas Service Corp., Chamber of Commerce Building, Indianapolis, plans extensions in steel pipe system in southern part of State. Cost over \$50,000.

Canton, Miss., plans steel pipe gas line distribution system. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Fabricated Structural Steel

AWARDS of 10,200 tons the past week compare with 19,300 tons in the previous two weeks. The largest booking was 2500 tons for a dam across the Mississippi River at Alma, Wis. Among new projects of 6750 tons are 1000 tons each for Mississippi River locks at Quincy, Ill., and Trempealeau, Wis. About 40,000 tons of sheet piling will be required for locks and dams on the upper Mississippi River. Structural steel awards for the week follows:

NORTH ATLANTIC STATES

Lisbon, N. H., 210 tons, State highway bridge, to McClintic-Marshall Corp.

Pelham, N. Y., 215 tons, State highway bridge, to Lackawanna Steel Construction Corp.

Philadelphia, 180 tons, building for Continental Distilling Co., to Morris, Wheeler & Co.

Bloomsburg, Pa., 100 tons, State highway garage, to Bethlehem Fabricators, Inc.

SOUTH AND SOUTHWEST

Winfield, W. Va., 1200 tons, Winfield locks, to Dravo Contracting Co.

Pensacola, Fla., 810 tons, airplane hangars, to Ingalls Iron Works.

Greer County, Okla., 520 tons, highway bridge, to Virginia Bridge & Iron Co., Inc.

State of Arizona, 260 tons, Globe-Shaw highway project, to Virginia Bridge & Iron Co.

State of New Mexico, 1255 tons, steel facing for El Vado Dam, Middle Rio Grande District, to American Bridge Co.

CENTRAL STATES

Indiana Harbor, Ind., 1010 tons, Youngstown Sheet & Tube Co. building, to Wisconsin Bridge & Iron Co.; previously reported to an unnamed bidder.

Milwaukee, 600 tons, Wisconsin Co-operative Brewery, Inc., to Wisconsin Bridge & Iron Co.

Alma, Wis., 2500 tons, dam across Mississippi River, to McClintic-Marshall Corp.; also 1000 tons of steel piling to Bethlehem Steel Co.

Independence, Wis., 150 tons, bridge, to Worden-Allen Co.

Garner, Iowa, 150 tons, bridge, to Pittsburgh-Des Moines Steel Co.

State of Iowa, 130 tons, bridge, to Clinton Bridge Works, Clinton, Iowa.

State of Missouri, 170 tons, bridge, to St. Joseph Structural Steel Co.

Leeds, Mo., 730 tons, bridge, to Kansas City Structural Steel Co.

WESTERN STATES

Pueblo, Colo., 190 tons, furnace shell, to William B. Pollack Co.

Eagle County, Colo., 250 tons, State highway structure, to an unnamed bidder.

Boundary County, Idaho, 106 tons, Bureau of Public Roads project, to an unnamed bidder.

Lane County, Ore., 217 tons, three bridges, to Poole & McGonigle.

Plumas County, Cal., 123 tons, bridge over Feather River, to Virginia Bridge & Iron Co.

Los Angeles, 100 tons, telephone building, to Pacific Iron & Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 300 tons, cranes for New York Navy Yard.

Morris Plains, N. J., 120 tons, State bridge over route 5; bids close Oct. 23.

State of New York, 240 tons, Allegany County bridge; bids taken Oct. 17.

Orangeburg, N. Y., 1800 tons, Rockland State Hospital; bids revived.

Oneonta, N. Y., 325 tons, State highway bridge.

Newark, N. J., 200 tons, stock house for Gottfried Kreuger Brewing Co.

Jersey City, N. J., 500 tons, building for Alpine Brewing Co.

Washington, 500 tons, radio towers for United States Department of Agriculture.

Washington, 190 tons, beam spans for United States Department of Agriculture.

THE SOUTHWEST

State of Oklahoma, 330 tons, bridge.

CENTRAL STATES

State of Ohio, 100 tons, Ottawa and Williams County bridges; bids Oct. 22.

Quincy, Ill., 225 tons, steel shed extension to wharf No. 12; Missouri Bridge & Iron Co., St. Louis, low bidder.

Quincy, Ill., 1000 tons, locks.

Trempealeau, Wis., 1000 tons, Mississippi River Lock No. 6; bids close Oct. 26.

Reinforcing Steel

Awards 3050 Tons—New Projects 14,500 Tons

Boston, 350 tons, hospital kitchen, to Barker Steel Co.

Boston, 300 tons, American League baseball bleachers, to Joseph T. Ryerson & Son, Inc.

Brookline-Newton, Mass., 200 tons, State bridge and highway, to Joseph T. Ryerson & Son, Inc.

Manchester, N. H., 150 tons, reservoir, to Concrete Steel Co.

Onondago County, N. Y., 125 tons, road mesh, to American Steel & Wire Co.

Torrington, Conn., 100 tons, road mesh, to American Steel & Wire Co.

Alma, Wis., 300 tons, dam across Mississippi River, to a Minneapolis bidder.

Wilmette, Ill., 100 tons, parochial school, to Kalman Steel Co.

State of Arizona, 335 tons, two highway projects, to Concrete Engineering Co.

Eagle County, Colo., 101 tons, State highway structure, to an unnamed bidder.

Moffat County, Colo., 100 tons, two highway projects, to an unnamed bidder.

Monterey County, Cal., 104 tons, State bridge over Carmel River, to Soule Steel Co.

Los Angeles County, Cal., 192 tons, State highway work, to Blue Diamond Corp., Ltd.

Butte County, Cal., 150 tons, bridge over Feather River, to Concrete Engineering Co.

Los Angeles, 200 tons, Medical Association library, to an unnamed bidder.

State of Washington, 115 tons, paving in six counties, to various bidders.

Spokane, Wash., 113 tons, County bridge on Government Way road, to Builders Supplies.

NEW REINFORCING BAR PROJECTS

Erie County, N. Y., 3500 tons, requirements for bridge replacement program; bids probably not called until spring.

Green Bay, Wis., 100 tons, metropolitan sewerage system; bids close Oct. 25.

Pittsville, Wis., 150 tons, State highway bridge.

Upper Mississippi River, 40,000 tons steel piling for dams and locks.

Kansas City, Mo., 6000 tons, municipal auditorium; new bids Nov. 6.

State of Nebraska, 460 tons, highway bridge.

Cloquet, Minn., 300 tons, State highway bridge.

WESTERN STATES

Denver, 300 tons, five overhead cranes for Boulder Dam; bids Nov. 17.

Jefferson County, Ore., 178 tons, bridge over Deschutes River; bids Oct. 25.

San Francisco, 4000 tons, Federal building; new bids Nov. 7.

Seattle, 325 tons, six bridges for Alaska Road Commission; plans revised, new bids under advisement.

Bakersfield, Cal., 200 tons, highway bridge.

FABRICATED PLATE

AWARDS

Miami, Fla., 230 tons, City Ice & Fuel Co. brewery tanks, to Birmingham Tank Co.

Chicago, 1000 tons, tanks, to Graver Tank & Mfg. Co.

Trona, Cal., 400 tons, tanks, to an unnamed bidder.

NEW PROJECTS

Seattle, 150 tons, improvement on Fifteenth Avenue, South; bids soon.

Morris Plains, N. J., 100 tons, bridge over route 5; bids close Oct. 23.

Upper Mississippi River, 5000 tons, dams.

Springfield, Ill., 300 tons, power house.

Chicago, tonnage being estimated, six proposed housing projects, one requiring about 500 tons.

Trempealeau, Wis., 350 tons, Mississippi River Lock No. 6; bids close Oct. 26.

Green Bay, Wis., 210 tons, metropolitan sewerage system; bids close Oct. 25.

San Francisco, 700 tons, Federal building; new bids Nov. 7.

Pearl Harbor, T. H., 2400 tons, repair basin at Navy Base; bids Nov. 15.

Eureka, Cal., 150 tons, Montgomery Ward building; bids soon on revised plans.

Santa Clara County, Cal., 177 tons, State paving work; bids Nov. 1.

Orange County, Cal., 105 tons, State bridge over Santa Ana River; bids Nov. 1.

Los Angeles County, Cal., 700 tons additional, White Point outfall sewer; application made for loan.

Puget Sound, Wash., 3000 tons, machine shop at Navy Yard; K. E. Parker general contractor.

Glendale, Cal., 425 tons, Chevy Chase reservoir roof; bids Oct. 26.

Empire Sheet and Tinplate Co. Organized

THE Empire Sheet and Tinplate Company has been organized to acquire the plants of the Empire Steel Corp. in Mansfield, Niles and Ashtabula, Ohio, which were to be offered for sale at public auction by the receiver in Mansfield, Oct. 18. The new company is composed largely of creditors and suppliers of materials. No change in the present organization is expected.

Lead and Copper Prices Swing Downward As Sellers Attempt to Attract Buying

Electrolytic Offered Into First Quarter at 7.75c.; Lead Drops \$5 a Ton to 4.25c., New York; Tin Sells at 46.75c.; Zinc Quiet

NEW YORK, Oct. 17.—Holding electrolytic copper offerings at 1c. under the long-established 9c. level, custom interests succeeded in placing less than 1500 tons of metal. Fabricators showed no inclination to replenish stocks at the 8c. position, and today custom smelters opened books at 7.75c., delivered Connecticut Valley. It is evident that a determined effort is being made to establish a trading level in order to liquidate partially scrap intakes. Considering the undiminished volume of deliveries on old contracts and the low volume of bookings during the past two months, it is estimated that a sizable potential demand has been built up. Mine producers continue to adhere to a nominal 9c. position, and consequently are completely out of the present market. Based on October bookings, it is expected that shipments this month will produce a

stock decrease similar to the 15,000-ton reduction made in September. Refined copper, as of Sept. 30, aggregated 528,500 tons, and copper authorities contend that production restriction should continue until stocks approach 200,000 tons.

Foreign imports totaled 67,000 tons in September, which constituted the largest monthly movement in several years. Prices abroad declined from 7.75c. to today's level of 7.60c., c.i.f. Continental ports. Moderate sales are reported by American and African interests.

Tin

Throwing off the inertia of the past two months, consumers have entered the market to pick up moderate ton-nages of refined and Straits metal on price breaks. Weakness in London, together with marked dollar strength,

has resulted in the lowest domestic quotations since mid-September. Spot Straits sold this morning at 46.75c. a lb., New York, and London postings on first call were £221 17s. 6d. for spot and future standard, and £228 12s. 6d. for spot Straits. On occasions metal was available in New York at 46.12½c. for first quarter positions, but an erratic sterling exchange prevented any general consumer participation at that figure. Sellers are anxious for business, but are not inclined to shade quotations.

Lead

Desirous of moving accumulated intake, major smelters on Monday dropped quotations \$2 a ton to the July 7 level of 4.40c. a lb., New York. Consumer reaction was negligible and late today trading was established \$3 a ton lower at 4.25c., New York, and 4.10c., St. Louis. The reactionary tendency resulted from a combination of copper weakness, low volume of October purchases, and a stronger dollar position which yesterday brought the import equivalent of London pig lead to 4.50c. a lb., New York. Major smelting interests believe lead at 4.25c. is sufficiently low to attract buying which was delayed during the past two weeks. Sales for October delivery exceed the monthly average for the year, but total considerably less than the high July and August levels. November bookings are very light, but the current low quotation is expected to result in heavy coverage of future positions.

Zinc

Demand for spelter is outwardly quiet, and inquiry is limited to car-load lots. Consumers are apparently uninterested in forward supplies, and are additionally hesitant because of sharp breaks in other metals. Prime Western, usually sensitive, is, however, holding at 4.75c. a lb., East St. Louis, and 5.12c., New York, for positions into the first quarter. It is indicated that firm bids at shaded levels would be considered in some directions for November metal, but the lack of competitive demand is preventing drastic price weakness. Normal trading prevailed last week, and bookings approximated 3500 tons at an average level of 4.75c. a lb. About 1000 tons was for first quarter delivery. Deliveries are declining slightly, but the aggregate volume of releases is considered satisfactory. According to the American Zinc Institute, September sales of slab zinc totaled 9309 tons at a weighted average price of 4.6984c. a lb. Forward sales amounted to 9000 tons at 4.724c. a lb., East St. Louis. Joplin concentrates are steady at \$31 a ton, and production continues to exceed sales. Tri-State stocks remain at the comparatively high position of 10,400 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Oct. 11	Oct. 12	Oct. 13	Oct. 14	Oct. 16	Oct. 17
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.50
Lake copper, New York	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	47.87½	47.87½	47.00	46.50	46.50	46.75
Zinc, East St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Zinc, New York	5.12	5.12	5.12	5.12	5.12	5.12
Lead, St. Louis	4.35	4.35	4.35	4.35	4.25	4.10
Lead, New York	4.50	4.50	4.50	4.50	4.40	4.25

*Refinery quotations; price ¼c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.87½c. a lb., New York.
Brass ingots, 85-5-5-5, 8.50c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	9.50c. to 10.25c.
Copper, electrolytic	9.25c. to 9.75c.
Copper, castings	9.00c. to 10.00c.
*Copper sheets, hot-rolled	17.12½c.
*High brass sheets	14.75c.
*Seamless brass tubes	16.37½c.
*Seamless copper tubes	16.62½c.
*Brass rods	12.25c.
Zinc, slabs	6.00c. to 7.00c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	5.25c. to 6.25c.
Lead, bar	6.75c. to 7.75c.
Lead, sheets	8.25c.
Antimony, Asiatic	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelt-ing, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	29.50c. to 30.50c.
Babbitt metal, commercial grade	25.00c. to 50.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	49.75c.
Tin, bar	51.75c.

Copper, Lake	10.125c. to 10.25c.
Copper, electrolytic	10.125c. to 10.25c.
Copper, casting	9.875c. to 10.00c.
Zinc, slab	6.00c. to 6.25c.
Lead, American pig	5.25c. to 5.50c.
Lead, bar	8.50c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	55.00c.
Solder, ½ and ½	29.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.75c.	7.50c.
Copper, hvy. and wire	5.75c.	7.25c.
Copper, light and bot-toms	5.00c.	5.75c.
Brass, heavy	3.50c.	4.00c.
Brass, light	3.00c.	3.50c.
Hvy. machine com-position	4.50c.	5.25c.
No. 1 yel. brass turn-ings	4.25c.	5.00c.
No. 1 red brass or compos. turnings	4.00c.	4.75c.
Lead, heavy	3.50c.	3.875c.
Zinc	2.75c.	3.25c.
Cast aluminum	7.50c.	8.75c.
Sheet aluminum	11.50c.	13.00c.

Purnell Tells Results of Employee Representation

OPERATION of the Employees' Representation Plan of the Youngstown Sheet & Tube Co. during the last 15 years has greatly improved employee relations and working conditions, according to Frank Purnell, president, writing in the current issue of the company's monthly magazine for employees.

The Representation Plan fulfills all collective bargaining requirements of the NRA, says Purnell, who is chairman of the labor division of the American Iron and Steel Institute committee formed to enforce the steel code.

Declaring that much confusion exists upon the subject of employee relations under the NRA, Purnell writes:

"There is nothing in the law compelling an employee to join any organization in order to receive all of the advantages of collective bargaining in NRA. These advantages are guaranteed by law to each and every employee, whether union or non-union.

"Membership in any organization is not a matter of compulsion—it is a matter of free choice. Our Representation Plan was the form chosen by employees. Years of successful opera-

tion prove that their choice was a wise one.

"Employees have had complete freedom in selecting their own representatives for the purpose of dealing collectively with the management on matters pertaining to wages, hours, and general working and welfare conditions.

"Our Plan has worked well and smoothly since its introduction. It has become interwoven with the very fabric of administration of the business. No external organization could replace it without sacrifice of the direct contact between employees and the management, from which has flowed a genuine improvement in employee relations and conditions.

"Not the least of the benefits of the plan, both to the company and its employees, has come from the constructive and helpful suggestions by employees' representatives.

"These representatives have shown themselves alert to the needs and views of the men in the works, and have not hesitated to represent their constituents with courage and force, as well as with a balanced intelligence."

tation vehicles. It was the adoption of his plan that resulted in the building of a large plant at Baltimore for the maintenance of war trucks and cars. He remained in the service at Washington until the Armistice was declared.

Mr. Randles was active in the National Machine Tool Builders Association and served as a director and treasurer of that organization for several years. He was a director of the National Acme Co., Cleveland, and one of the founders of Associated Industries, formed in Cleveland in 1920 by leading industrial companies. He



G. E. RANGLES

OBITUARY

GEORGE E. RANGLES, president, Foote-Burt Co., Cleveland, and for years a conspicuous leader in the machine tool industry, died Oct. 14, aged 57 years. He had been in poor health for some time. Born on a farm near Argyle, N. Y., Mr. Randles supplemented his education in the public schools with a course in a night technical school. In 1893 he became an apprentice in the plant of Pratt & Whitney Co., Hartford, Conn. After completing his apprenticeship he served as a machinist and tool maker and traveling demonstrator. In 1899 to 1900 he was the company's European representative. He became affiliated with the Foote-Burt Co. in 1906 as vice-president and manager and continued in this capacity until 1919 when he was elected president.

While associated with the Foote-Burt Co. he made important contributions to the machine tool industry in the development of special drilling, boring and tapping machines, which helped to make possible mass production of automobiles at low cost. When the United States entered the World War, Mr. Randles was made director of the Maintenance Division of Motor Transport Corps of the U. S. Army and while serving in this capacity he developed and put in successful operation a system for the repair and rebuilding of army automotive transpor-

served that organization for two terms as president and had been a member of its board of governors since its organization. He was a member of the American Society of Mechanical Engineers and the Society of Automotive Engineers.

♦ ♦ ♦

FRANK D. CARNEY, formerly general metallurgist for the Bethlehem Steel Co. and until his retirement last year a member of the firm of Carney & Lindemuth, consulting engineers, New York, died at his home at Andover, Mass., on Oct. 3, aged 68 years. He was graduated in 1887 from Massachusetts Institute of Technology and then served as metallurgical engineer for the Pennsylvania Steel Co. until 1897, when he went to Germany as consulting metallurgical engineer for Ludwig Loewe & Co. at Berlin. Five years later he returned to the United States and became general superintendent of the Pennsylvania Steel Co. In 1915 he was appointed general metallurgist for the Bethlehem Company, from which he resigned in 1919.

♦ ♦ ♦

WILLIAM CUSHMAN LETCHWORTH, retired iron and steel manufacturer, died suddenly at his home in Buffalo, on Oct. 10. Born in Buffalo, 77 years ago, Mr. Letchworth was educated at Dr. Briggs' academy and immediately upon leaving this school entered the employ of Pratt & Letchworth, iron manufacturers. This company had been founded by his father, Edward H. Letchworth, and three uncles. Mr. Letchworth remained with the company until 1896, when he became manager of the Acme Steel & Malleable Iron Works. He retired in 1923.

♦ ♦ ♦

JOHN DAVISON, general manager of the Barrow Hematite Steel Co., Ltd., Barrow-in-Furness, England, died on Oct. 7, aged 60 years.

Locomotive Backlog Gains Four Units

WASHINGTON, Oct. 17.—One steam and one electric locomotive were shipped in September, according to reports received by the Bureau of the Census from the principal manufacturing plants. Both were for domestic use. Unfilled orders at the end of September totaled 83 units, a gain of four over unfilled orders at the end of August.

In an attempt to increase railroad passenger travel in the West, the basic passenger fares will be reduced and the Pullman surcharge eliminated by railroads in the Western district on Dec. 1. This action was taken following a meeting of the Western Association of Railway Executives at Chicago on Oct. 6, and will be conducted for an experimental period of six months.

Labor Board Orders Weirton Strikers Back

(Concluded from Page 50)

those committees. If the company begins the practice of negotiating with any committee that presents itself, it will not be complying with the provisions of the code which it has signed and its covenants with the President, and it is apparent that great confusion might result if several committees present themselves to negotiate with us.

"It has always been our policy, however, to hear any committee of our own employees, and we will continue that policy. Any complaint or grievance may be presented to us by any individual or group of employees, but all negotiations or collective bargaining must be with the committees selected."

Pursuant to this, notice was given that I would meet any of our employees who desired to see me at the office in Weirton on Monday, Oct. 2, and on that day I saw committees consisting of about three hundred employees and representing various departments of the works, who without exception requested the reopening of the mills and stated that the great majority of our employees did not know what it was all about, had no complaint and wanted an opportunity to work.

Majority Wanted to Work

On Oct. 3, I addressed and mailed a second letter to all of our employees, copy of which is attached and pursuant to which on Monday, Oct. 9, notices were posted advising employees that all departments would open on Tuesday morning, Oct. 10, at 8 A. M. Approximately 3000 men reported for work on the first day at Weirton, in spite of the picketing and intimidation, and the plant has been operating every day since with increasing numbers of employees. At the time the strike started we had in our employ a normal working force of 9858 persons and today, Monday, Oct. 16, we have 5074 of these employees working, and all departments of all the mills are operating.

The leaders of the strike have persisted in the grossest misrepresentations. On one day last week they stated publicly that there were only 200 men at work at Weirton, when, as a matter of fact, there were over 3000 men then working. Even the slightest examination would have shown that the statements of the strike leaders were grossly in error. There have been no strike breakers brought into any of the mills and this is well known to the leaders of the strike, yet they persistently assert, again and again, for the purpose of inflaming their followers, that large numbers of strike breakers have been imported by us.

A representative of the Department of Labor, who came to Weirton to make an investigation, was quoted as saying that there were no strike breakers employed and that the strike leaders were making statements not supported by facts. He said: "I can't understand where the union gets its information. They must be relying on someone pretty careless."

At our 'Steubenville plant, where we have normally employed 900 persons, a meeting of employees was held, on their own initiative, in the county court house, to take a vote upon their desire to return to work. Almost all of the employees attended the meeting and it was decided that all the employees would abide by the judgment of the majority. After about half the votes had been cast

secretly, the general sentiment in the meeting was so strongly in favor of returning to work that a count of the votes then cast was demanded, which showed that 428 were in favor of returning to work, as against 12 opposing it, and the meeting adjourned with this practically unanimous decision to return to work. There are now at work in that plant 825 men. This confirms the statements of our employees to us of the desire of the great majority of them to return to work and if it were not for the violence and intimidation carried on by the strike leaders and their sympathizers, we believe that we would have 90 per cent of our employees at work tomorrow.

The Weirton Steel Co. has operated its plant at Weirton, W. Va., continuously from 1913 until the time it was shut down for two weeks during this labor disturbance. There has never been a time since when there was not smoke coming from our stacks and furnaces until the past three weeks.

The percentage of operation at Weirton during the whole period of the depression has far exceeded the percentage of operation in the steel plants of the country as a whole and we have distributed the work among our employees so that there has been less relief work necessary in Weirton than in almost any other industrial center. Many of the men in our mills have had 100 per cent employment continuously, and the wages we have paid are equal to those of any other steel company in the country and in excess of many of them. Our payroll amounts to one and one-quarter millions of dollars per month; and for two weeks our mills were shut down solely because of the action of this group of strike leaders and their sympathizers in preventing those who wish to work from entering the mills.

Surely this Board and the Administration do not want to encourage such conduct. If there were any grievances brought to us by the duly elected representatives of our employees which we could not settle with them, we would be glad to submit them to this Board for arbitration, but we cannot arbitrate any matter with self-constituted committees or strike leaders who so disregard all principles of fairness and justice and institute strikes without any notice, demand, or warning to the company or without any vote on the part of the employees.

It is obvious that if a group of men claiming to have been elected at a mass meeting of employees attended not only by employees but others, can announce themselves as the representatives of our employees and demand that we negotiate with them, collective bargaining will soon become a farce. If a small group of employees without any prior demand or opportunity on the part of the management to consider their grievances are permitted to deprive thousands of other men of their opportunity to work, the very purpose of the National Recovery Act has been defeated.

The Weirton Steel Co. is operating under the steel code and the NRA. It is willing to recognize representatives regularly chosen by its employees by secret ballot, whether the representatives are employees or not. The next regular election of employee representatives will occur in December of this year. Surely collective bargaining must imply some re-

sponsibility on the part of the employees and an obligation on the part of employers to recognize during the term of office representatives duly chosen by the workers by secret ballot.

The newspapers have stated that the object of this strike was to force the company to recognize the Amalgamated Association of Iron, Steel and Tin Workers. Under the National Recovery Act we are required to employ our workers without regard to their membership or non-membership in any labor organization, there is no requirement of the steel code, the NRA, or the President's Recovery Program, that we make any contract with any labor union, and we could not consent to submitting to your Board the question of whether or not we would contract with the Amalgamated Association or any other organization. If that is the question which these complainants desire to submit to your Board for arbitration, we must decline to submit it.

This emphasizes the uncertain nature of this proceeding before this Board.

If there was any matter properly before your Board for decision, fairness and justice would require that we should be advised of the complaint that has been made. If your Board is going to sit as a court to determine who is right in any controversy, elemental principles of justice require that each side should be informed of what matter is in controversy to be arbitrated.

If our employees or their representatives had presented any matter to us which we could not settle between ourselves and either side had submitted the matter to your Board for arbitration, it would be possible to present the definite question involved and we could both prepare to meet it. We have had no notice of any grievance to be submitted for arbitration. If we were going into a hearing before this Board we would not know what grievance was complained of or how to prepare to meet it. We regret the action of these strike leaders in forcing upon our employees and the community the large economic loss that has occurred by reason of the idleness of so many men, and believe the majority of the strikers were prevented from working without knowing what the strike was about.

Summary of Position

To summarize, our position is this: We cannot submit to arbitration the settled policy of the company to maintain an open shop and not to contract with the Amalgamated Association of Iron, Steel and Tin Workers.

We cannot enter into any arbitration with strike leaders who institute a strike without warning, notice or demand of any kind. We feel that to do so would encourage unscrupulous strike leaders to promote strikes without any foundation or real grievance but only for the self aggrandizement of the leaders. We feel that this Board should not encourage such unfounded strikes and irresponsible leadership by dignifying their complaints with a hearing. We cannot negotiate or arbitrate with these strike leaders but must deal only with the representatives regularly chosen by secret ballot by our employees.

We wish to show no disrespect for this Board and would have no hesitancy in submitting to arbitration by the Board any proper dispute arising between ourselves and the rightful representatives of our employees which we could not settle between ourselves. There is no such dispute before you now and we must, with the greatest respect to the members of your Board, decline to offer any evidence or submit to arbitration.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh mill	1.75c
F.o.b. Chicago or Gary	1.80c
Del'd Philadelphia	2.01c
Del'd New York	2.08c
F.o.b. Cleveland	1.80c
F.o.b. Buffalo	1.85c
F.o.b. Birmingham	1.90c
F.o.b. cars dock Pacific ports	2.30c
F.o.b. cars dock Gulf ports	2.15c
Rail Steel	
(For merchant trade)	
F.o.b. Cleveland	1.70c
F.o.b. Chicago	1.70c
F.o.b. Gary	1.70c
F.o.b. Pittsburgh	1.65c
F.o.b. Buffalo	1.75c
F.o.b. Birmingham	1.80c

Billet Steel Reinforcing

(Stock lengths as quoted by distributors; cutting to length, 60 in. and over takes extra of 10c. per 100 lb.)	
F.o.b. P'gh mills	1.80c
F.o.b. Birmingham	1.85c
F.o.b. Buffalo	1.85c
F.o.b. Cleveland	1.85c
F.o.b. Youngstown	1.85c
F.o.b. Chicago or Gary	1.85c
F.o.b. cars dock Pacific ports	2.35c
F.o.b. cars dock Gulf ports	2.20c

Rail Steel Reinforcing

(Cut lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.75c
F.o.b. Cleveland	1.80c
F.o.b. Chicago	1.80c

Iron

Common iron, f.o.b. Chicago	1.60c
Refined iron, f.o.b. P'gh mills	2.75c
Common iron, del'd Phila.	1.74c
Common iron del'd New York	1.90c

Steel Car Axles

F.o.b. Pittsburgh	2.50c
F.o.b. Chicago	2.50c

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c
F.o.b. Chicago	1.75c
F.o.b. Gary	1.75c
F.o.b. Birmingham	1.85c
Del'd Cleveland	1.85c
Del'd Philadelphia	1.85c
F.o.b. Coatesville	1.80c
F.o.b. Sparrows Point	1.80c
Del'd New York	1.95c
F.o.b. cars dock Pacific ports	2.25c
F.o.b. cars dock Gulf ports	2.10c
Wrought iron plates, f.o.b. P'gh	3.00c

Floor Plates

F.o.b. Pittsburgh	3.20c
F.o.b. Chicago	3.25c

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c
F.o.b. Chicago	1.75c
F.o.b. Birmingham	1.85c
F.o.b. Buffalo	1.80c
F.o.b. Bethlehem	1.80c
Del'd Cleveland	1.85c
Del'd Philadelphia	1.90c
Del'd New York	1.95c
F.o.b. cars dock Gulf ports	2.10c
F.o.b. cars dock Pacific ports (standard)	2.25c
F.o.b. cars dock Pacific ports (wide flange)	2.35c

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c
F.o.b. Chicago mill	2.00c
F.o.b. Buffalo	2.00c

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	
Open-hearth grade, base, 2.45c a lb. except at Bethlehem where the price is 2.55c.	
S.A.E. Alloy Series	
Numbers	Differential per 100 Lb.
2000 (1/4% Nickel)	\$0.25
2100 (2 1/4% Nickel)	0.55
2300 (3 1/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.50 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95
Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms,	

billets and slabs under 4 1/2 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4 1/2 in. to 10 1/2 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh mill	1.95c
Bars, f.o.b. Chicago	2c
Bars, Cleveland	2c
Bars, Buffalo	2c
Bars, Detroit	2.15c
Bars, eastern Michigan	2.20c
Shafting, ground, f.o.b. mill	1 1/4 in. 3.25c
	1 3/16 to 1 1/2 in. 2.75c
	1 9/16 to 1 3/4 in. 2.60c
	1 15/16 to 2 1/4 in. 2.45c
	2 1/2 to 6 in. 2.30c

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

No. 10, f.o.b. Pittsburgh	1.75c
No. 10, f.o.b. Gary	1.85c
No. 10, del'd Phila.	2.04c
No. 10, f.o.b. Birmingham	1.90c
No. 10, f.o.b. cars dock Pacific ports	2.42 1/2c

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c
No. 24, f.o.b. Gary	2.35c
No. 24, del'd Phila.	2.54c
No. 24, f.o.b. Birmingham	2.40c
No. 24, f.o.b. cars dock Pacific ports	2.95c
No. 24, wrought iron, Pittsburgh	4.30c

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c
No. 10 gage, f.o.b. Gary	2.40c
No. 10 gage, del'd Phila.	2.59c
No. 10 gage, f.o.b. cars dock Pacific ports	3.00c

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c
No. 20 gage, f.o.b. Gary	2.85c
No. 20 gage, del'd Phila.	3.04c
No. 20 gage, f.o.b. cars dock Pacific ports	4.45c

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c
No. 24, f.o.b. Gary	2.95c
No. 24, del'd Phila.	3.14c
No. 24, f.o.b. Birmingham	3.00c
No. 24, f.o.b. cars dock Pacific ports	3.55c
No. 24, wrought iron, Pittsburgh	4.95c

Long Terne

No. 24, unassorted 8-lb. coating	
f.o.b. Pittsburgh	2.90c

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c
---------------------------	-------

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.50c
No. 28, Gary	2.60c

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	\$4.65
Standard cokes, f.o.b. Gary	4.75

Terne Plate

(P.O.B. Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

	Base per Lb.
All widths up to 24 in., P'gh	1.75c
All widths up to 24 in., Chicago	1.85c
Cooperage stock, Pittsburgh	1.85c
Cooperage stock, Chicago	1.95c

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c
F.o.b. Cleveland	2.40c
Del'd Chicago	2.60c
F.o.b. Worcester	2.60c

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c
---------------------------------	-------

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)	
To Manufacturing Trade	
Bright wire	2.10c
Spring wire	3.10c

To Jobbing Trade

Extras of 10c a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of \$2 a ton is made to jobbers on straight, mixed or joint carloads; \$3 a ton is allowed on less-than-carload shipments.	
---	--

STEEL AND WROUGHT PIPE AND TUBING

	Base per Keg
Standard wire nails	\$2.10
Smooth coated nails	2.10
Galvanized nails	3.60
	Base per 100 Lb.
Smooth annealed wire	\$2.25
Smooth galvanized wire	2.60
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Woven wire fence, base column	55.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

	Steel	Black Galv.	Wrought Iron	Black Galv.
Inches				
1/4	51 1/2	29 1/2	1/4	+91 1/2 +138
3/8	57	38 1/2	3/8	+1 1/2 +21 1/2
1/2	62	50 1/2	1/2	31 1/2 15
3/4	65 1/2	55 1/2	3/4	36 1/2 20 1/2
1 to 3	67 1/2	58 1/2	1 1/4	39 1/2 25 1/2
			1 1/2	43 1/2 28
			2	41 1/2 26

Lap Weld					
2	63½	54½	2	37	22½
2½ to 3 ..	66½	57½	2½ to 3½	38	25
3½ to 6 ..	68½	59½	4 to 8 ..	40	28½
7 and 8 ..	67½	57½	9 to 12 ..	38	24½
9 and 10 ..	67	57			
11 and 12 ..	66	56			

Butt Weld, extra strong, plain ends					
1/4	48 1/2	33 1/2	1/4	+13	+45 1/2
3/8	54 1/2	41 1/2	3/8	+2 1/2	+34 1/2
1/2	60	51	1/2	32 1/2	17 1/2
3/4	64 1/2	55 1/2	3/4	37 1/2	22 1/2
1 to 3	66 1/2	58 1/2	1 to 2	43 1/2	29

Lap Weld, extra strong, plain ends					
2	61½	53½	2	40	26
2½ to 3 ..	65½	57½	2½ to 4 45½	33	
3½ to 6 ..	69	61	4½ to 6 45	32½	
7 and 8 ..	68	58	7 & 8 ..	46	33
9 and 10 ..	67	57	9 to 12. 41½	30	
11 and 12 ..	66	56			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

	Steel	Charcoal Iron
2 in. and 2 1/4		1 1/4 in. 1
1 in. 33		1 1/4 in. 8
2 1/2 in.—2 3/4 in. 40		2 in.—2 1/4 in. 13
3 in.—4 in. 47		2 1/2 in.—2 3/4 in. 16
3 1/2 in.—4 1/2 in. 50		3 in.—4 in. 17
4 in. 52		3 1/2 in. to 3 3/4 in. 18
4 1/2 in. to 6 in. 42		4 in. 20
		4 1/2 in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two lives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one fire; 10,000 lb. to carload 4 points under base and two fires. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one fire.	
--	--

Standard Commercial Seamless Boiler Tubes

	Cold-Drawn	Hot-Rolled
1 in. 61	3 in. 41	
1 1/4 to 1 1/2 in. 53	3 1/2 to 3 3/4 in. 44	
1 3/4 in. 37	4 in. 46	
2 to 2 1/4 in. 27	4 1/2, 5 and 6 in. 36	
2 1/2 to 2 3/4 in. 34		

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard

gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon, 0.10% to 0.30% base (carloads) 35
Carbon, 0.30% to 0.40% base 30
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier, per gross ton	\$40.00
Angle bars, per 100 lb.	2.35

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	\$32.90
Light rails (from rail steel) per gross ton	31.00
	Base per 100 Lb.
Spikes, 9/16 in. and larger	\$2.40
Spikes, 1/2 in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.40
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Per Cent Off List	

Machine bolts	25
Carriage bolts	25
Lag bolts	25
Flange bolts, Nos. 1, 2, 3 and 7 heads	25
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagonal	70
C.n.e. and t. square or hex nuts, blank or tapped	70
Semi-finished hexagonal nuts	70
Semi-finished hexagonal castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	72 1/2, 25 and 10
Stove bolts in packages, Ch'go	72 1/2, 25 and 10
Stove bolts in packages, Cleveland	72 1/2, 25 and 10
Stove bolts in bulk, P'gh	85
Stove bolts in bulk, Chicago	85
Stove bolts in bulk, Cleveland	85
Tire bolts	80

Large Rivets

(1/2-in. and larger)	
Base per 100 Lb.	
F.o.b. Pittsburgh or Cleveland	\$2.75
F.o.b. Chicago and Birmingham	2.85

Small Rivets

(7/16-in. and smaller)	
Per Cent Off List	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birmingham	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)	
Per Cent Off List	
Milled cap screw, 1 in. dia. and smaller	25
Milled standard set screws, case hardened, 1 in. dia. and smaller	80
Milled headless set screws, cut thread 1/4 in. and smaller	75 and 10
Unset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. dia. and smaller	85 and 10
Unset set screws, sq. head	80
Milled studs	70

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham.	
Per Gross Ton	

Rerolling	\$20.00
Forging quality	31.00

Sheet Bars

F.o.b. Pittsburgh, Youngstown, Cleveland, Chicago, Buffalo, Canton, Sparrows Point.	
Per Gross Ton	

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$35.00
Cleveland	35.00
Chicago	36.00
Birmingham	38.00
Youngstown (del'd)	36.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.
Base price, \$19 a gross ton except at Bethlehem, where it is \$51.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville	\$3.75
Prompt	
Foundry, f.o.b. Connellsville	\$4.25 to 5.75
Prompt	
Foundry, by-product, Chicago	8.00
Ovens, for delivery outside switching districts	
Foundry, by-product, Phila.	8.75
del'd in Chicago switching district	
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	8.76
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.55 to \$1.80
Mine run coking coal f.o.b. W. Pa. mines	1.80 to 2.00
Gas coal, f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.23c.
	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat	Intermediate
Duty Brick	Duty Brick
Pennsylvania	\$45.00
Maryland	45.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per ton	7.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chevelan, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd	
Chicago	\$13.00 to \$14.00
4-in., del'd Chicago	46.00 to 47.00
6-in. and larger, del'd New York	38.00
4-in., del'd New York	42.00
6-in. and larger, Birmingham	\$35.00 to 36.00
4-in., Birmingham	38.00 to 39.00
Class "A" and gas pipe, \$3 extra.	

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$18.00	\$18.50	\$17.50	\$19.00
Bethlehem, Pa.	17.50	18.00	17.00	18.50
Birdsboro, Pa.	17.50	18.00	17.00	18.50
Swedeland, Pa.	17.50	18.00	17.00	18.50
Sprerows Point, Md.	17.50	18.00	17.00	18.50
Neville Island, Pa.	18.00	18.00	17.50	18.50
Youngstown, Pa.	17.50	17.50	17.00	18.00
Youngstown, Pa.	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	17.00	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	18.00	17.00	18.50
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Chicago, Ohio	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	17.50	17.00	18.00
Duluth, Minn.	18.00	18.00	17.00	18.00
Birmingham	13.50	18.00	13.50	18.50
Provo, Utah	16.50		12.50	

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston and nearby New England	\$18.50	\$19.00	\$18.00	\$19.50
From Everett, Mass.	18.50	19.00	18.00	19.50
From Buffalo	19.77	20.27	19.27	20.77
From East. Pa. or Buffalo	18.89	19.39	18.39	19.89
Newark or Jersey City, N. J.	18.26	18.76	17.76	19.26
From East. Pa. or Buffalo	18.51	18.51	18.01	19.01
Philadelphia	18.76	18.76		
From Eastern Pa.	19.50	19.50		
Cincinnati	19.26	19.26		
From Hamilton, Ohio	19.77	19.77		
Canton, Ohio	19.55	19.55		
From Cleveland and Youngstown	18.50	18.50		
Columbus, Ohio	19.44			
From Hamilton, Ohio	19.26	19.26		
Mansfield, Ohio	20.04	20.54		
From Cleveland and Toledo				
Indianapolis				
From Hamilton, Ohio				
South Bend, Ind.				
From Chicago				
Milwaukee				
From Chicago				
St. Paul				
From Duluth				
Davenport, Iowa				
From Chicago				
Kansas City				
From Granite City				

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points:	Per Gross Ton
Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$22.00
Johnson, Ct., Tenn.	22.00
F.o.b. Valley furnace	22.00
Del'd Chicago	27.65

GRAY FORGE PIG IRON

Valley furnace	\$17.50
----------------	---------

CHARCOAL PIG IRON

Lake Superior furnace	\$20.50
Delivered Chicago	23.54
Delivered Buffalo	23.78

CANADA

Pig Iron

Per gross ton:	
Delivered Toronto	\$21.00
No. 1 fdy., sil. 2.25 to 2.75	20.50
No. 2 fdy., sil. 1.75 to 2.75	21.00
Malleable	
Delivered Montreal	\$22.50
No. 1 fdy., sil. 2.25 to 2.75	22.00
No. 2 fdy., sil. 1.75 to 2.25	22.50
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	\$32.00
Domestic, 80%, seaboard, (less carloads)	80.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	\$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace			
Per Gross Ton			Per Gross Ton
.....	\$22.25	12%	.....\$29.25
.....	23.25	13%	.....30.75
.....	24.25	14%	.....32.25
.....	25.25	15%	.....33.75
.....	26.25	16%	.....35.25
.....	27.25	17%	.....36.75

Ferrovanadium, del., per lb. contained Van.	\$2.60 to \$2.80
Ferrocobalt, 15 to 18% per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c.
Iron, low phos., Swedish, average 68 1/2% iron	8.50c.
Iron, basic or foundry, Swedish, average, 65% iron	8c.
Iron, basic or foundry, Russian, aver. 65% iron (nom.)	8c.
Manganese, Caucasian, washed 52% 48%	22c.
Manganese, African, Indian, 48%	20c.
Manganese, African, Indian, 51%	21c.
Manganese, Brazilian, 48 to 48 1/2%	17c.

Per Net Ton Unit

Tungsten, Chinese wolframite, duty paid*	\$12.00
Tungsten, domestic scheelite*	\$11.00 to \$12.00
	Per Gross Ton
Chrome, 45%, Cr ₂ O ₃ , crude, c.i.f.	16.00
Atlantic seaboard, Cr ₂ O ₃ , c.i.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	\$15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	18.50
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2% silica, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting steel	10.50 to 11.00
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	14.50 to 15.00
Sheet car crops, ordinary	13.00 to 13.50
Compressed sheet steel	11.50 to 12.00
Hand bundled sheet steel	10.75 to 11.25
Hyd. steel axle turnings	10.50 to 11.00
Machine shop turnings	9.00 to 9.50
Short shov. steel turnings	9.00 to 9.50
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron car wheels	11.00 to 11.50
Heavy breakable cast	10.50 to 11.00
No. 1 cast	11.50 to 12.00
Rail. knuckles and couplers	13.50 to 14.00
Rail. coil and leaf springs	13.50 to 14.00
Roller steel wheels	13.50 to 14.00
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.50 to 15.00
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.50 to 15.00
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	\$9.50 to \$9.75
Shoveling steel	9.50 to 9.75

Hydraulic comp. sheets	\$7.75 to \$8.25
Drop forge flashings	7.25 to 7.75
No. 1 busheling	7.75 to 8.25
Roller car wheels	11.00 to 11.50
Railroad tires	10.75 to 11.25
Railroad leaf springs	11.00 to 11.50
Axle turnings	8.00 to 8.50
Steel couplers and knuckles	10.50 to 11.00
Coil springs	11.50 to 12.00
Axle turnings (elec. fur.)	8.00 to 8.50
Low phos. punchings	11.50 to 12.00
Low phos. plates, 12 in. and under	11.50 to 12.00
Cast iron borings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Machine shop turnings	5.50 to 6.00
Rolling rails	11.00 to 11.50
Steel rails, less than 3 ft.	11.50 to 12.00
Steel rails, less than 2 ft.	12.00 to 12.50
Angle bars, steel	10.50 to 11.00
Cast iron car wheels	10.00 to 10.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.00 to 8.50

Per Net Ton

Iron car axles	\$12.50 to \$13.00
Steel car axles	11.00 to 11.50
No. 1 railroad wrought	8.25 to 8.75
No. 2 railroad wrought	8.25 to 8.75

No. 2 busheling	\$4.00 to \$4.50
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	4.75 to 5.25
No. 1 machinery cast	10.00 to 10.50
Clean automobile cast	10.00 to 10.50
No. 1 railroad cast	8.50 to 9.00
No. 1 agricultural cast	8.75 to 9.25
Stove plate	7.00 to 7.50
Grate bars	6.75 to 7.25
Brake shoes	8.75 to 9.25

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting steel	8.50 to 9.00
No. 1 railroad wrought	11.00
Bundled sheets	8.50 to 9.00
Hydraulic compressed, new	10.00 to 10.50
Hydraulic compressed, old	8.00 to 8.50
Machine shop turnings	7.50
Heavy axle turnings	9.50
Cast borings	7.00
Heavy breakable cast	10.50 to 11.00
Stove plate (steel work)	11.00
No. 1 low pipe, heavy	13.00 to 14.00
Couplers and knuckles	13.00 to 13.50
Roller steel wheels	13.00 to 13.50
No. 1 blast furnace	6.00 to 6.50
Spec. iron and steel pipe	9.00 to 9.50
Shafting	14.50 to 15.00
Steel axles	13.50 to 14.00
No. 1 forge	10.50
Cast iron car wheels	11.50 to 12.00
No. 1 cast	11.00 to 12.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00 to 12.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting steel	9.50 to 10.00
Compressed sheet steel	9.00 to 9.50
Light bundled sheet stampings	8.50 to 9.00
Drop forge flashings	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.50 to 8.00
No. 1 busheling	9.00 to 9.50
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	12.50 to 13.00
Cast iron borings	7.00 to 7.50
Mixed borings and short turnings	7.00 to 7.50
No. 2 busheling	7.00 to 7.50
No. 1 cast	11.00 to 11.50
Railroad grate bars	6.50 to 7.00
Stove plate	7.50 to 8.00
Rails under 3 ft.	10.00 to 10.50
Rails for rolling	10.50 to 11.00
Railroad malleable	10.00 to 10.50
Cast iron car wheels	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.00
No. 2 heavy melting scrap	9.00
Scrap rails	\$8.75 to 9.25
New hydraulic, comp. sheets	9.00
Old hydraulic, comp. sheets	8.50
Drop forge flashings	9.00
No. 1 busheling	9.00
Hvy. steel axle turnings	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Balanced steel wheels	11.50 to 12.00
Low phos. billet crops	12.50 to 13.00
Short short, steel turnings	7.00 to 7.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.00 to 6.50
Steel car axles	11.00 to 12.00
Iron axles	11.00 to 12.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Steel rails, 3 ft. and under	12.50 to 13.00
Cast iron car wheels	10.00 to 10.50
Industrial malleable	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Chemical borings	9.00 to 10.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$10.00 to \$10.50
Scrap steel rails	9.00 to 9.50
Short shoveling turnings	7.50
Stove plate	7.00 to 7.50
Steel axles	11.00 to 11.50
Iron axles	11.00 to 11.50
No. 1 railroad wrought	7.00 to 7.50
Rails for rolling	10.50
No. 1 cast	10.50 to 11.00
Tramcar wheels	9.50 to 10.00
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$10.00 to \$10.50
No. 1 heavy melting	9.00 to 9.50
No. 2 heavy melting	7.50 to 8.00
No. 1 locomotive tires	8.50 to 9.00
Misc. stand-sec. rails	10.00 to 10.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.75 to 9.25
No. 1 busheling	6.50 to 7.00
Cast iron borings and shoveling turnings	4.75 to 5.25
Rails for rolling	10.50 to 11.00
Machine shop turnings	4.50 to 5.00
Heavy turnings	5.50 to 6.00
Steel car axles	11.50 to 12.00
Iron car axles	12.50 to 13.00
Wrot. iron bars and trans.	9.50 to 10.00
No. 1 railroad wrought	7.00 to 7.50
Steel rails less than 3 ft.	11.50 to 12.00
Steel angle bars	10.00 to 10.50
Cast iron car wheels	8.00 to 8.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
Stove plate	7.00 to 7.50
Relay rails, 60 lb. and under	16.00 to 16.50

Relay rails, 60 lb. and over	\$20.00 to \$21.00
Agricult. malleable	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to 7.50
Scrap T rails	6.75 to 7.25
Machine shop turnings	2.75 to 3.00
Cast iron borings	4.50 to 4.75
Bundled skeleton, long	5.50 to 6.00
Forge flashings	4.75 to 5.00
Blast furnace scrap	4.75 to 5.00
Shafting	9.00 to 9.50
Steel car axles	8.50 to 9.00
Wrought pipe	3.50 to 4.00
Rails for rolling	5.00 to 5.50
Cast iron borings, chemical	7.50 to 8.00
Per gross ton delivered consumers' yards:	
Textile cast	\$7.00 to \$11.00
No. 1 machinery cast	10.00 to 11.00
Stove plate	6.25 to 6.50
Railroad malleable	11.00 to 12.00

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.50 to \$8.00
No. 2 heavy melting steel	6.50 to 7.00
Unprepared yard iron and steel	3.50 to 4.00
No. 1 heavy breakable cast	6.50 to 6.75
Machine shop turnings	3.50
Short shoveling turnings	3.50
Cast borings	4.50 to 4.75
No. 1 blast furnace	3.50 to 4.00
Steel car axles	10.00 to 10.50

Warehouse Prices for Steel Products

PITTSBURGH

Base per lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.60c
Reinforcing steel bars	2.60c
Cold-finished and screw stock—	
Rounds and hexagons	3.20c
Squares and flats	3.20c
Hoops and bands, under 1/4 in.	2.95c
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c
Galv. sheets (No. 24), 25 or more bundles	3.50c
Hot-rolled sheets (No. 10)	2.50c
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.32
Spikes, large	2.40c
Small	2.65c
Boat	2.90c
Track bolts, all sizes, per 100 count	70 per cent off list.
Machine bolts, 100 count	70 per cent off list.
Carriage bolts, 100 count	70 per cent off list.
Nuts, all styles, 100 count	70 per cent off list.
Large rivets, base per 100 lb.	
Wire, black, soft ann'd, base per 100 lb.	2.96
Wire, galv. soft, base per 100 lb.	3.35
Common wire nails, per keg	2.45
Cement coated nails, per keg	2.45
On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.	

CHICAGO

Base per lb.	
Plates and structural shapes	3.10c
Soft steel bars	2.90c
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.25c
Flats and squares	3.25c
Bands, 3/16 in. (in Nos 10 and 12 gages)	3.20c
Hoops (No. 14 gage and lighter)	3.20c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.30c
Hot-rolled sheets (No. 10)	2.85c
Spikes (9/16 in. and lighter)	3.50c
Track bolts	4.50c
Rivets, structural (leg lots)	3.10c
Rivets, boiler (leg lots)	3.10c
Per Cent Off List	
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq. tap, or blank	65
Hot-pressed nuts, hex. tap, or blank	65
Hex. head and cap screws	80 and 10
Cup point set screws	75
Flat head bright wood screws	60 and 10
Spring cotters	60 and 10
Stove bolts	72 1/2
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	\$5.50 off list
No. 8 black ann'd wire per 100 lb.	\$3.45
Com. wire nails, base per keg	2.70c
Cement c'd nails, base per keg	2.70c

NEW YORK

Base per lb.	
Plates	3.30c
Structural shapes	3.27c
Soft steel bars, small shapes	3.17c
Iron bars	3.24c
Iron bars, swed. charcoal	6.50c to 7.00c
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.79c
Flats and squares	4.29c
Cold-rolled strip, soft and quarter hard	4.00c
Hoops	3.42c
Bands	3.42c
Hot-rolled sheets (No. 10)	3.00c
Hot-rolled ann'd sheets (No. 24)	3.65c
Galvanized sheets (No. 24)	4.25c
Long term sheets (No. 24)	4.75c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel 1/2 x 1/2 in. and larger	3.40c
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.75c

Spec. iron and steel pipe	\$4.50 to \$5.00
Forge fire	5.50 to 6.00
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Rails for rolling	8.50 to 9.00
No. 1 cast	7.00 to 7.50
No. 2 cast	6.00 to 6.50
Stove plate	6.00 to 6.50
Cast borings (chemical)	12.00 to 12.50

Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$10.00
No. 1 hvy. cast (cupola size)	9.00
No. 2 cast	8.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$8.75 to \$9.25
Scrap rails for melting	9.25 to 9.75
Loose sheet clippings	5.00 to 5.50
Bundled sheets	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Machine shop turnings	5.50 to 6.00
No. 1 busheling	7.00 to 7.50
No. 2 busheling	3.50 to 4.00
Rails for rolling	9.50 to 10.00
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.25 to 11.75
Cast iron car wheels	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
Burnt cast	6.75 to 7.25
Stove plate	6.25 to 7.25
Agricultural malleable	8.75 to 9.25
Railroad malleable	9.25 to 9.75

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.25 to \$7.75
Borings and short turnings	6.00 to 6.50
Long turnings	5.50 to 6.00
No. 1 machinery cast	7.75 to 8.25
Automotive cast	9.50 to 10.00
Hydraul. comp. sheets	7.25 to 7.75
Stove plate	5.75 to 6.25
New factory busheling	6.50 to 7.00
Old No. 2 busheling	5.00 to 5.50
Sheet clippings	5.00 to 5.50
Flashings	6.00 to 6.50
Low phos. plate scrap	8.00 to 8.50

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$5.50 \$5.50
Rails, scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 4.00
Axles, wrought iron	4.50 4.50
No. 1 machinery cast	7.75 8.00
Stove plate	4.50 5.00
Standard car wheels	7.25 7.00
Malleable	6.75 7.00

Open hearth spring steel, bases	
3.75c to 10.00c	
Common wire nails, base, per keg \$3.00	
Machine bolt, cut thread	
1/2 x 6 in. and smaller	65
1 x 30 in. and smaller	65
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller	65
3/4 x 20 in. and smaller	65
Boiler tubes:	
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	21.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c higher per 100 lb.

ST. LOUIS

Base per lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fin. rounds, shafting, screw stock	
Hot-rolled annealed sheets (No. 24)	3.60c
Galv. sheets (No. 24)	4.25c
Hot-rolled sheets (No. 10)	3.10c
Black corrug. sheets (No. 24)	3.65c
Galv. corrug. sheets	4.30c
Structural rivets	3.25c
Boiler rivets	3.25c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	65
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	65
200 to 999 lb.	60
100 to 199 lb.	55
Less than 100 lb.	50

PHILADELPHIA

Base per lb.	
*Plates, 1/4 in. and heavier	2.60c
*Structural shapes	2.60c
*Soft steel bars, small shapes, iron bars (except bands)	2.60c
Reinforc. steel bars, sq. twisted and deformed	2.30c
Cold-finished steel bars	3.58c
*Steel hoops	3.15c
*Steel bands, No. 12 to 3/16 in.	
incl.	2.90c
Spring steel	5.00c
*Hot-rolled annealed sheets (No. 24)	3.40c
*Galvanized sheets (No. 24)	4.00c
*Hot-rolled annealed sheets (No. 10)	2.75c
Diam. nat. floor plates, 1/4 in.	4.35c
Swedish iron bars	6.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

CLEVELAND

Base per lb.	
Plates and struc. shapes	3.21c
Soft steel bars	2.90c
Reinforc. steel bars	2.00c to 2.50c
Cold-fin. steel bars	
Rounds, squares, hexagons	3.25c
Flats	3.25c
Flat rolled steel under 1/4 in.	3.55c
Cold-finished strip	3.55c
Hot-rolled annealed sheets (No. 24)	3.76c
Galvanized sheets (No. 24)	4.36c
Hot-rolled sheets (No. 10)	3.01c
Black ann'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.35

*Not base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25
Bars, soft steel or iron	3.00
New billet reforc. bars	3.00
Rail steel reforc. bars	3.00
Hoops	3.75
Bands	3.20

1934 Officials Named by Wire Machinery Builders

AT the first annual meeting of the Wire Machinery Builders' Association recently held in Detroit, the following officers were elected for the ensuing year:

President, Philip M. Morgan, Morgan Construction Co.; Vice-President, L. A. Vaughn, Vaughn Machinery Co.; Vice-President, Josiah Judd, Thomson-Judd Wire Machinery Co.; Secretary and Treasurer, G. D. Hartley, Sleeper & Hartley, Inc.

Executive Committee: Philip M. Morgan, Chairman; W. D. Pierson, Waterbury Farrel Foundry & Machine Co.; Harold Wells, Frank L. Wells Co.; E. F. Shuster, F. B. Shuster Co.; L. A. Vaughn, Vaughn Machinery Co.

Representative to MAPI: Philip M. Morgan.

Code and Fair Practice Committee: E. F. Shuster, F. B. Shuster Co.; G. D. Hartley, W. D. Pierson, L. A. Vaughn, R. H. Brennan, E. J. Manville Machine Co., President (Ex-Officio).

Statistical and Accounting Committee: L. A. Vaughn, Harold Wells, W. D. Pierson, Jacob Nilson, A. H. Nilson Machine Co.

Experience with Tungsten Carbide Saws

(Concluded from Page 31)

chamber to permit cooling as well as heating in the same non-oxidizing atmosphere.

The parts to be brazed, each with a small piece of copper wire attached, are placed on the hearth at the front of the furnace and as they are pushed in they advance the whole charge and thus continue on through the furnace and into the cooling chamber. The temperature in the furnace is maintained at approximately 2150 deg. Fahr. At this temperature the copper melts and spreads to fully cover the contact surfaces between tungsten carbide tips and steel tooth bases and to thus form a strong bond when the unit cools. The entire process of heating and cooling through the brazing furnace takes about two hours. The size of the furnace limits the work to comparatively small pieces although teeth up to 6 in. in length are being brazed. The company engineers have found that the nature of the hydrogen atmosphere has an important bearing on the strength of the brazed joint and therefore the hydrogen before it is used is refined to eliminate any excess moisture.

After annealing, the teeth are tested and then are returned to the lapping machines for final truing,

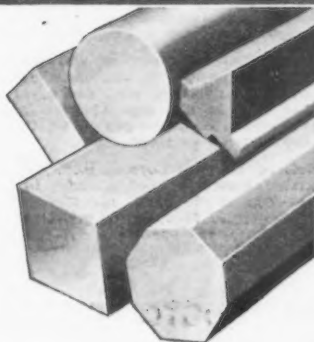
after which they are again tested and are then put into stock. Losses through the brazing operation have been cut to about 1 per cent by carefully standardizing all of the conditions.

Next to the importance of a firm, brazed joint between the tungsten carbide disk and the steel backing of a saw tooth is the design of the tooth and of the tip itself. For heavy work the tip must have ample backing of steel and the present method is to carry the steel of the tooth up as far as possible in back of the Carboly and then to carry the steel of the saw plate itself up to support the steel of each tooth.

The General Electric Co. at its Bloomfield, N. J., plant is successfully using tungsten carbide tipped inserted tooth saws for cutting copper bus bars. The saws used are 14 in. in diameter and 5/32 in. wide. They have 40 teeth per saw and are operated at 3400 r.p.m. The bars cut are of hard rolled copper 3 3/4 in. wide by 1/2 in. thick and production at present is 300 pieces cut per hr. against 160 with high speed steel. More than 5000 cuts are made before regrinding the Carboly tipped saws which compares with 200 pieces before regrinding when high speed steel saws were used.

*The Rapid Duplication
of Machined Steel Parts
at Lowest Cost Continues
to Depend Upon That
Perfection and Precision
Which Only*

**COLD DRAWN STEELS
CAN GIVE**



WYCKOFF

In this period of exceptionally close margins,—you cannot afford to take chances with an inferior product. Only through the use of cold drawn steel bars such as are manufactured by this company, can you obtain the increased physical characteristics, exactness to size, straightness and guaranteed machining performance so essential to the maintenance of present-day production costs.

The WYCKOFF organization will welcome an opportunity of cooperating with you, any time,—anywhere.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.
MILLS—Ambridge, Penna. and Chicago, Ill.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NEW ENGLAND ▶

Bowler Brewing Co., Lafayette Street, Worcester, Mass., has plans for extensions and modernization, including new equipment. Cost over \$75,000 with machinery. J. R. Worcester & Co., 79 Milk Street, Boston, are engineers.

City Welding & Radiator Co., Inc., Worcester, Mass., has been organized by Harvey A. Houck, 2 Harvard Place, and associates, to operate a general welding and sheet metal works.

Bridgeport Brewing Co., Railroad Avenue, Bridgeport, Conn., has let general contract to E. & F. Construction Co., 94 Wells Street, for remodeling former factory for brewery. Brewhouse, bottling, storage and distributing and other equipment will be installed. Cost over \$85,000 with machinery.

Holland System Breweries, Inc., Boston, recently organized, has taken title to industrial buildings and property at 89 Conant Street, Roxbury district, and will remodel for new plant.

Board of Water Commissioners, South Swansea, Mass., plans installation of pumping machinery and other equipment for municipal water system. Cost \$125,000. Metcalf & Eddy, Statler Building, Boston, are engineers.

◀ NORTH ATLANTIC ▶

Westchester County Board of Supervisors, White Plains, N. Y., plans new county airport near Croton Point, including hangars, repair shop, oil and gasoline storage and distributing plant and other units, including administration buildings. Cost over \$1,500,000 with equipment. County Park Commission, J. Mayhew Wainwright, head, will be in charge. Immediate surveys authorized.

Ebling Brewing Co., Inc., 937 Fulton Street, Brooklyn, has leased building at Tompkinsville, S. I., formerly occupied by Overseas Storage Warehouse Co., for new branch storage and distributing plant. Company has arranged for merger with Michel Brewing Corp., Brooklyn.

American Bent Steel Co., Inc., Long Island City, has been organized by Harry DeVoe, 4027 Gleane Street, Elmhurst, L. I., and associates, to manufacture iron, steel, copper and other metal products.

Bureau of Supplies and Accounts, Navy Department, Washington, has secured appropriation of \$185,000 for tools and machinery for New York Navy Yard and plans early call for bids.

New York Daily News, 220 East Forty-second Street, New York, has let general contract to Hegeman-Harris Co., Inc., 360 Madison Avenue, for two-story service building, 125 x 200 ft., at 514 East Twenty-third Street, including motor truck garage and repair department, paper storage and distribution division, and other operating units. Cost over \$75,000 with equipment.

Constructing Quartermaster, Mitchel Field, Long Island, N. Y., asks bids until Oct. 23 for underground electric distribution system, including conduits, power lines, etc.

Gold Medal Tin Ware Co., Inc., New York, has been organized by Louis Weinstock, 27 Rutgers Street, and Charles Cooper, 15 Sutton Place, to manufacture metal hampers, cans and other metal containers.

New York Water Service Corp., 90-02 Ninety-first Avenue, Richmond Hill, L. I., plans installation of pumping machinery and auxiliary mechanical equipment for increased water supply at Woodhaven, L. I., and vicinity.

Synco Wire Machine Co., Arlington, N. J., manufacturer of wire-working machinery, parts, etc., has leased floor in building at 187-93 Sylvan Avenue, Newark, N. J., for new plant.

Seaboard Storage Corp., 643-67 Smith Street, Brooklyn, has plans for new multi-story storage and distributing plant for bulk food products on waterfront property at Port Newark, Newark, N. J., recently leased from city. Cost about \$100,000 with elevating, conveying, loading and other equipment.

Berkeley Metal Products Co., Newark, N. J., has been organized by Bert C. George, Morris J. Oppenheim, 11 Commerce Street, and as-

sociates, to manufacture sheet metal cabinets and kindred products.

Barozzi Drying Machine Co., 965 Dell Avenue, North Bergen, N. J., has plans for extensions and improvements in one and two-story plant, 75 x 130 ft. Cost close to \$25,000.

American Rayon Co., Inc., Reed Street and River Road, Riverton, N. J., William H. Furness, head, recently organized, plans new cellulose rayon mill, to be ready for service early in 1934. Cost over \$85,000 with equipment. Mr. Furness was formerly head of Furness Corp., Gloucester, N. J., manufacturer of similar products.

du Pont Film Mfg. Corp., Parlin, N. J., has let general contract to Wigton-Abbott Corp., 143 Liberty Street, New York, for one and three-story casting building, 45 x 140 ft., two-story mixing works, 45 x 130 ft., and one-story filtering plant, 17 x 40 ft. Cost over \$200,000 with equipment.

Quaker City Brewing Corp., Philadelphia, recently organized, has taken title to former brewery of Joseph Straubmuller, Trenton Avenue and Hager Street, consisting of several multi-story buildings and will use for plant.

Triangle Farms, Inc., 51 Union Street, Brooklyn, milk products, is planning new milk processing, storage and distributing plant near Carlisle, Pa., where arrangements have been made with Capital City Milk Producers' Association, I. W. Miller, Mechanicsburg, Pa., president, for supply. Last noted organization will be interested in plant. Cost over \$25,000 with tanks, cans, conveyors, filling machinery and other equipment.

◀ BUFFALO DISTRICT ▶

Board of Education, City Hall, Buffalo, has authorized plans for new multi-story high school in Kensington district, with manual training department. Cost \$1,198,900 with equipment. Financing has been arranged in that amount. Bids on general contract will be called in 60 to 90 days.

McKechnie Brewery, Canandaigua, N. Y., recently acquired by new interests, headed by J. D. Sweet, Canandaigua, and associates, plans extensions and improvements, including new equipment. Cost over \$70,000 with machinery.

Buffalo Pipe & Foundry Corp., Sawyer Avenue, Tonawanda, N. Y., manufacturer of cast iron pipe, fittings, etc., has arranged for increase in capital from \$200,000 and 2000 shares common stock, no par value, to \$425,000 and 2500 shares common stock.

Precision Tappers Corp., Buffalo, has been organized under direction of Joseph A. Beninger and Richard H. Means, Crosby Building, capital \$600,000, to manufacture machine products and operate a general machine works.

◀ WASHINGTON DISTRICT ▶

National Brewing Co., 3700 O'Donnell Street, Baltimore, has filed plans for two new additions, four-stories, 50 x 100 ft., for stock house and distributing unit, and one-story, 66 x 88 ft., for brew-house and washing service. Cost about \$85,000 with equipment. Eugene A. Stopper, Liberty Trust Building, Philadelphia, is architect.

Maryland Pipe & Metal Corp., Hagerstown, Md., has been organized by Nathan Brenner, Hagerstown, and Udell N. Brenner, Roanoke, Va., to manufacture pipe and other metal products.

Consolidated Beef & Provision Co., 100 South Exeter Street, Baltimore, meat packer, plans two-story addition. Cost about \$25,000 with equipment. William F. Stone, Jr., 2612 North Charles Street, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 24 for 14 motor-driven engine lathes (Schedule 817) for Brooklyn, Pensacola, Philadelphia, San Diego and Mare Island Navy Yards; seven electric arc welding sets and spare parts (Schedule 834) for Brooklyn and San Pedro yards; 20 motor-driven portable pumps and spare parts (Schedule 827) for Eastern and Western yards; until Oct. 27, 2600 bomb body steel forgings (Schedule 835) for Washington yard.

◀ WESTERN PENNA. ▶

Cambria Brewing Corp., Cambria, Pa., has approved plans for extensions and improvements, including new equipment. Cost over \$70,000 with machinery.

McDaniel Refractory Porcelain Co., Beaver Falls, Pa., manufacturer of pyrometer tubes and other precision products, has let general contract to Leroy Freed, Beaver Falls, for new two-story and basement plant, 40 x 130 ft., to replace works recently destroyed by fire. Cost about \$30,000 with equipment. J. E. Martsoff, 512 Third Avenue, is architect.

United Natural Gas Co., Oil City, Pa., has let general contract to L. O. Bouquin, Oil City, for new two-story and basement equipment, storage and distributing plant, 100 x 150 ft., at Sage Run. Cost about \$40,000 with equipment.

Town Council, Summerville, W. Va., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for new municipal water and sewerage systems. Cost about \$200,000. Application has been made for Federal loan.

◀ SOUTHWEST ▶

International Business Machines Corp., 1105 Locust Street, St. Louis, main plant at Endicott, N. Y., has leased building at 1610 Locust Street, for new factory branch, storage and distributing plant. P. M. Maxwell is local manager.

Commanding Officer, Fort Leavenworth, Kan., has secured appropriation of \$812,573 for new construction and equipment, including hangar with repair shop, gas and oil storage units, warehouse, signal corps communication building, filtration plant and other structures. Also \$440,000 for reconditioning and improvements in electrical system, railroads and other utilities.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., has secured fund of \$200,000 for new three-story and basement high school with manual training department for colored students. Bids have been asked on general contract. Layton, Hicks & Forsyth, Braniff Building, are architects.

City Council, Tipton, Mo., plans installation of pumping machinery and auxiliary equipment, 75,000-gal. steel water tank on 125-ft. steel tower, pipe lines, etc., for new municipal water and sewer systems. Cost \$90,000. Financing is being arranged. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

A. B. C. Brewing Co., St. Louis, recently organized by A. D. Flamandon, St. Louis, and associates, has taken over former local American Brewery, Broadway and Dorcas Street, and will remodel for new plant. Cost about \$100,000, of which close to \$75,000 will be expended for machinery.

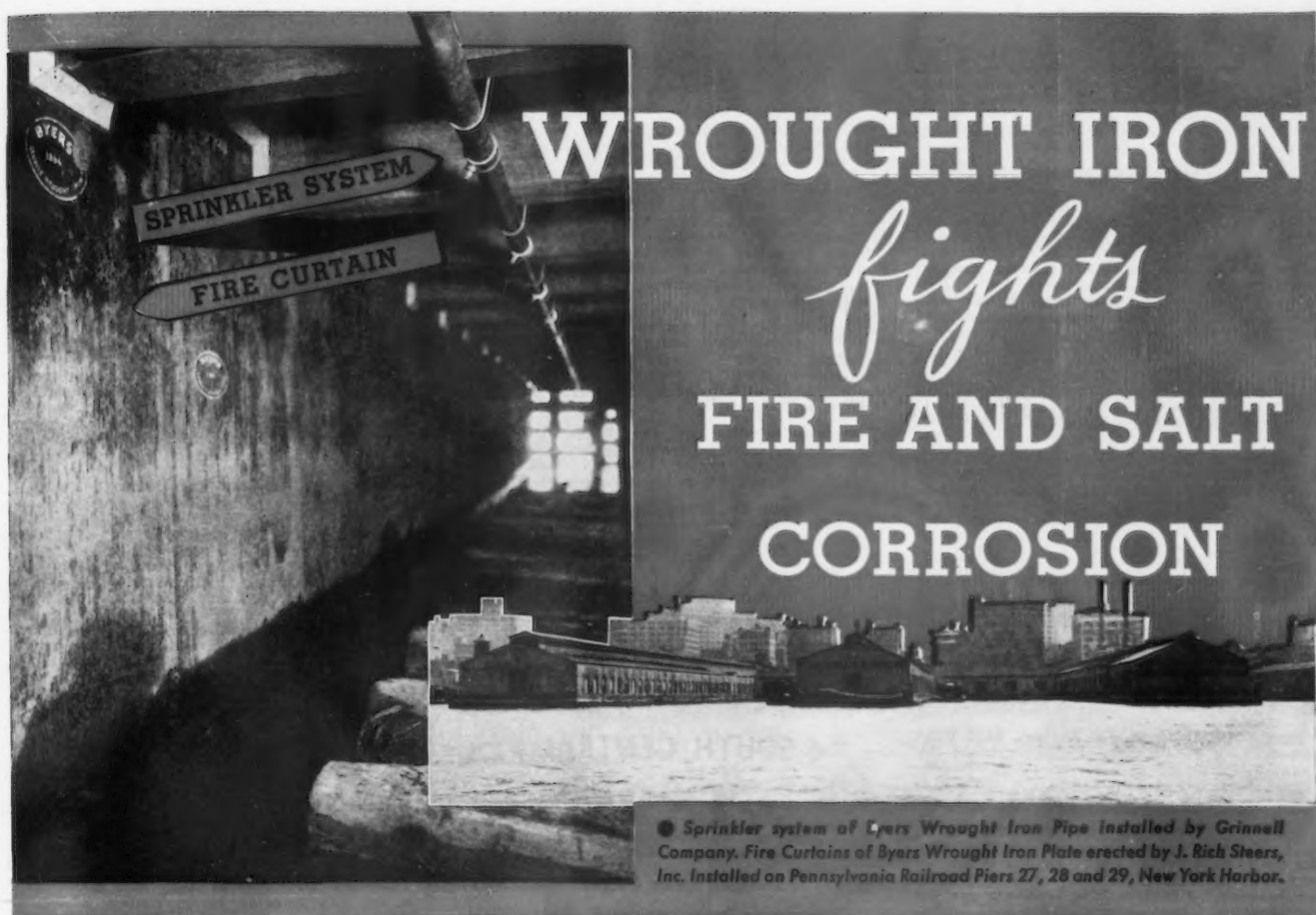
City Council, Monroe City, Mo., plans extensions and improvements in municipal electric light and power plant, including new equipment. Cost about \$60,000. Financing is being arranged. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Commanding Officer, Randolph Field, Tex., has secured appropriation of \$848,314 for new buildings and equipment, including alterations and improvements in hangars, engine test stands and buildings, oil and gasoline storage systems, and other structures.

◀ SOUTH ATLANTIC ▶

Board of Glynn County Commissioners, Brunswick, Ga., M. B. McKinnon, chairman, plans new county airport on St. Simons Island, including hangars with repair and reconditioning shops, gasoline and oil storage and distributing building, administration building and other units. Cost about \$85,000 with equipment. Financing is being arranged.

City Council, Daytona Beach, Fla., plans installation of pumping machinery and auxiliary mechanical equipment, two 500,000-gal. elevated steel storage tanks on steel towers, pipe lines, etc., for extensions and improvements



WROUGHT IRON

fights

FIRE AND SALT CORROSION

● Sprinkler system of Byers Wrought Iron Pipe installed by Grinnell Company. Fire Curtains of Byers Wrought Iron Plate erected by J. Rich Steers, Inc. Installed on Pennsylvania Railroad Piers 27, 28 and 29, New York Harbor.

METAL fire curtains represent a forward step in pier construction. The ideal metal fire curtain must be of reasonable cost, light weight, able to withstand shock and vibration fatigue, but above all must resist the highly corrosive action of salt-laden atmosphere and salt water.

Every engineer who has watched the durability of various commonly used ferrous metals in service in and around salt water will affirm that wrought iron has an unequalled record of long life.

One of the outstanding examples of wrought iron's long service in salt water and salt atmosphere was recently published in a well-known engineering periodical—"Wrought Iron Piles

Resist Salt Water 50 Years." (A reprint will be sent on request.)

Specify wrought iron for dock and pier protection. Sound engineering practice and service records will back you up. Our Engineering Staff will be glad to work with you in connection with any project where river, harbor or salt water corrosion is a factor.

Ask a Byers Engineer or write our Engineering Service Department for service records, engineering data or estimating prices. A. M. Byers Company, Established 1864. Pittsburgh, Boston, Washington, Philadelphia, Chicago, St. Louis, Houston, New York, Los Angeles.



BYERS GENUINE WROUGHT IRON PRODUCTS

PIPE • WELDING FITTINGS • RIVETS • SPECIAL BENDING PIPE • BAR IRON
PLATES • SHEETS • CULVERTS • FORGING BILLETS • STRUCTURALS

STANDARD of QUALITY for 69 YEARS  TODAY BETTER THAN EVER

in municipal waterworks. Cost about \$120,000. Financing is being arranged. George Asbell is city engineer.

United States Engineer Office, Wilmington, N. C., will receive bids about Nov. 15 for lock and dam at Tolar's Landing, Cape Fear River, near Fayetteville, N. C., including roller gates, gate operating mechanism, power house, pumping station and other operating units. Cost about \$1,000,000. Appropriation has been authorized.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Oct. 25 (postponed from Oct. 11) for new central steam power and heating plant at Naval Air Station, Corry Field, Pensacola, Fla., including watertube and fire-box boilers, oil burners, motor and turbine-driven air blowers, fuel oil pumping and heating equipment, boiler feed pumps, sump pumps, feed water heater with storage tank, motor and turbine-driven induced draft fans, fuel oil storage tanks, piping, etc. (Specification 7405).

◀ MIDDLE WEST ▶

Armstrong Paint & Varnish Works, 1330 South Kilbourn Avenue, Chicago, has let general contract to Campbell, Lowrie, Lautermilch Corp., 400 West Madison Street, for three-story addition. Cost about \$100,000 with equipment.

United States Engineer Office, Federal Building, Rock Island, Ill., asks bids until Oct. 24 for new lock No. 16 on Mississippi River, near Muscatine, Iowa, including 255,375 lb. steel forgings, 29,060 lb. iron castings, 101,019 lb. class B steel castings, 41,442 lb. corrosion resisting steel, gate valves, four lock-gate operating machines, four tainter valve operating machines, one central control station building, etc. (Circular 40).

Staats Hydraulic Appliance, Inc., 1612 First Street, Peoria, Ill., has been organized by Franklin E. Staats and Severen Berg, Peoria, to manufacture hydraulic appliances and equipment.

Shakopee Breweries, Inc., Shakopee, Minn., C. T. Weiland, president, is completing financing for extensions and improvements in former two and four-story flour mill, to be converted for brewery. Machinery requirements are being arranged. Cost about \$100,000 with equipment. Robert J. Torrens, Shubert Building, St. Paul, Minn., is consulting engineer.

John Hauenstein Co., New Ulm, Minn., is considering modernization of brewery, to include new vats, conveying, bottling and other equipment, boilers and accessories. Cost over \$50,000 with machinery.

Town Council, Lexington, Neb., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for extensions and improvements in municipal water system. Cost about \$50,000. Financing is being arranged.

Northern Gas & Pipe Line Co., Lincoln, Neb., operating natural gas properties, plans new compressor station near city. Cost about \$200,000 with machinery. Frank H. Brooks is president.

Tousey Varnish Co., 520 West Twenty-fifth Street, Chicago, has asked bids on general contract for rebuilding three-story storage and distributing plant recently destroyed by fire, with loss of about \$100,000 with equipment. Otto Randolph, Inc., 53 West Jackson Boulevard, is engineer.

Department of Public Property, Willis J. Spaulding, commissioner, Springfield, Ill., has secured Federal loan for \$78,000 for power transmission line, electric distribution equipment, and municipal automobile service and garage building.

◀ OHIO AND INDIANA ▶

Glauber Brass Co., Cleveland, recently organized by Robb O. Bartholomew, 2930 Edgehill Road, and associates, has acquired assets of local company of same name, manufacturer of plumbers' brass goods and kindred brass products. New company has leased one-story building, 120 x 240 ft., on Finney Avenue, for new plant.

United Distilleries Corp., Vancouver, B. C., care of Joseph Ostro, 14154 Superior Road, Cleveland, local representative, is considering new plant on site near city, to include power house, machine shop and other departments. Cost over \$500,000 with equipment.

City Council, Mogadore, Ohio, plans municipal electric light and power plant. Cost over \$80,000 with equipment. Financing is being arranged. Paul W. Elwell, 4300 Euclid Avenue, Cleveland, is consulting engineer.

Columbus Dental Mfg. Co., 634 Wager Street, Columbus, Ohio, has let general contract to Robert H. Evans, 395 East Broad Street, for two-story and basement addition, 48 x 100 ft., with foundations for third story later. Cost about \$50,000 with equipment. R. R. Reeves, 203 East Broad Street, is architect. C. L. Morris is general manager.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Oct. 25 for 22,100 twist drills (Circular 100), 60,000 hose clamps (Circular 101).

Cedar Valley Distillery, Wooster, Ohio, has been acquired by new interests, headed by Carroll Maxwell, 806 Standard Bank Building, Cleveland, and associates. New company is being organized to take over property, which will be expanded with several new units and installation of equipment. Cost over \$75,000 with machinery.

Liberty Ice & Brewing Co., 1624 Central Avenue, Cincinnati, has asked bids on general contract for four-story and basement addition to brewery, 31 x 107 ft. Cost over \$65,000 with equipment. Clarence F. Waltz is company engineer.

Town Council, Hope, Ind., plans installation of pumping machinery and auxiliary equipment for municipal water system. Cost about \$60,000. Financing is being arranged.

Eno, Cain Co., Inc., 1502 Merchants Bank Building, Indianapolis, has been organized by Chauncey H. Eno and Joseph E. Cain, to manufacture printing presses, engraving machines, parts, etc.

Terre Haute Brewing Co., Terre Haute, Ind., has been acquired by Oscar Baur, 4919 North Meridian Street, Indianapolis, and associates. Plant will be remodeled and improved, and new equipment installed. Cost over \$65,000 with machinery.

◀ SOUTH CENTRAL ▶

Tennessee-Eastman Corp., Kingsport, Tenn., has approved plans for expansion in cellulose plant, including new multi-story mill units to double present facilities, new filtration plant and addition to power house. Cost close to \$4,000,000 with equipment. Company is a subsidiary of Eastman Kodak Co., Rochester, N. Y.

Constructing Quartermaster, Barksdale Field, Shreveport, La., has secured appropriation of \$2,170,078 for new buildings and equipment, including machine shop, ordnance warehouse, magazines, garage, gasoline storage system, hangars, incinerator plant, night lighting system and other buildings.

Cummins Distillery Corp., Louisville, A. J. Cummins, head, has plans for extensions and improvements in plant at Athertonville, Ky., including new units and equipment. Cost over \$100,000 with machinery. W. C. Wagner, Breslin Building, Louisville, is architect.

City Council, Coushatta, La., plans new municipal electric light and power plant to cost \$125,000 with equipment. Also arranging fund of \$50,000 for extensions and improvements in water and sewer systems, including pumping machinery and other equipment.

◀ MICHIGAN DISTRICT ▶

Bastian-Blessing Co., 1313 Payne Avenue, Cleveland, manufacturer of soda fountains, brewery equipment, etc., will concentrate production in plant at Grand Haven, Mich., where expansion will be carried out. Equipment will be removed from other factories, including works at Chicago, to Grand Haven.

Midwest Refining Co., Alma, Mich., B. J. Skinner, Grand Rapids, Mich., head, will soon begin erection of new oil refinery on site recently acquired at Alma. Cost over \$125,000 with machinery.

Becharas Hydro Thermal Corp., 134 West Vernor Highway, Detroit, has been organized by Nicholas Becharas, 2017 Florence Avenue, and associates, to manufacture electric water heaters and parts.

Hill-Top Brewing Co., Jackson, Mich., recently organized to take over former Haehnle Brewing Co., plans extensions and improvements, including modernization of former brewery and installation of new equipment. Company is disposing of stock issue of \$107,500, considerable part of fund to be used for purpose noted. Frank Freundl is president, and George M. North, Jr., vice-president and treasurer.

Village Council, Morenci, Mich., has authorized new municipal electric light and power plant, and will arrange financing for \$125,000 for project.

◀ PACIFIC COAST ▶

Bailey Brewing Co., 2215 East Valley Boulevard, Rosemead (Los Angeles County), Cal., R. M. Bailey, president, plans new brewery, to include power house and machine shop. Cost close to \$100,000 with equipment. Richard Farrell, 731 North Marguerita Street, Alhambra, Cal., is architect.

Commanding Officer, Hamilton Field, Cal., has secured appropriation of \$3,515,984 for new buildings and equipment, including field shops, headquarters and operations building, quartermaster maintenance building, quartermaster warehouse ordnance and chemical storage and distributing building, railroad tracks, magazines, gasoline storage and distributing building, incinerator plant, paint and oil storage units, garage and other structures.

Emelio Giometti, head of Fresno-Madera Ice Co., and Yosemite Ice Cream Co., both Fresno, Cal., has engaged W. D. Coates, Jr., architect, Rowell Building, to draw plans for new three-story brewery, 80 x 140 ft., with one-story bottling plant and other units on site recently purchased. Cost about \$160,000 with equipment. New company will be organized to operate brewery.

Bureau of Reclamation, Denver, asks bids until Nov. 17 for four 300-ton capacity double trolley, motor-operated, overhead traveling cranes, 64-ft. span, with one set of lifting beams; also one 50-ton capacity, single trolley, motor-operated traveling crane, 58-ft. 2-in. span, for Boulder hydroelectric generating plant, Boulder City, Nev. (Specifications 549).

City Council, Long Beach, Cal., is planning new municipal airport, with hangars, repair and reconditioning shops, and other field units. Cost \$105,000 with equipment. Bond issue will soon be arranged. Mayor M. E. Paddock is active in project.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 24 for 3300 lb. half-oval brass boat facings (Schedule 802) for Puget Sound Navy Yard; 3000 doz. hand frame hacksaw tungsten blades (Schedule 836); until Oct. 27, 12,000 ft. plow steel wire rope (Schedule 837) for Mare Island Navy Yard.

Geysers Development Co., 417 South Hill Street, Los Angeles, R. E. Bering, president, plans new power plant at Healdsburg, Cal., including two 1000-kva. turbo-generator units and auxiliary equipment; also installation of heavy-duty gasoline engine and 100-kva. generator unit, with auxiliary equipment at pumping station, same place. Cost over \$60,000 with machinery.

◀ FOREIGN ▶

Municipal Public Works Bureau, Tokyo, Japan, plans new garbage reduction plant for conversion into fertilizer, located in Fukagawa district. Cost over \$100,000 with machinery.

Entre Rios Railway Co., Cangallo 564, Buenos Aires, Argentine Republic, is arranging schedule of fiscal year requirements of mechanical equipment for shops and other service, engine parts, telephone wire and cable, etc., and plans early purchases.

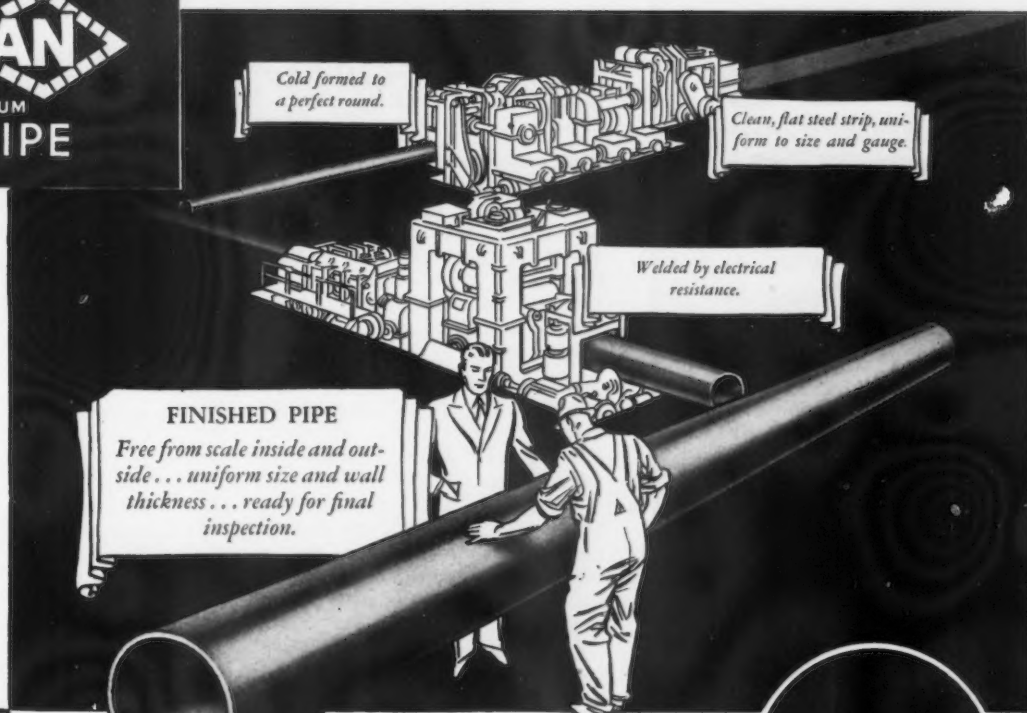
Lobitos Oilfields, Ltd., Ellesmere Port, Manchester ship canal, near Manchester, England, operating oil properties in Peru, has acquired property near Stanlow Oil Dock, Ellesmere Port, for new crude oil refinery, with storage and distributing facilities. Cost over \$150,000 with equipment.

Fuji Spinning Co., Tokyo, Japan, is organizing a subsidiary with capital of about 10,000,000 yen (\$2,280,000) to erect new cellulose rayon mill. Cost about \$1,000,000 with machinery.

Ministry of Interior, Cairo, Egypt, asks bids until Nov. 14 for electric-operated pumping machinery and accessory equipment, miscellaneous machine tools, boilers, motors and other equipment.

El Mante Sugar Co., Ltd., El Mante, State of Tamaulipas, Mexico, plans rebuilding part of cane sugar mill, including buildings and equipment, recently damaged by hurricane. Loss about 1,000,000 pesos (\$300,000).

Zhirtrest (Fat Products Trust), Soviet Russian Government, Moscow, has approved plans for new plant near Gorky, Kanavino district, for manufacture of synthetic acids, using oil distillates from soap production as raw material. Plant will have output of 10,000 tons of synthetic acids and 2500 tons of oil acids a year. Cost close to \$1,000,000 with machinery.



A two-fold ADVANTAGE



Buyers of Toncan Iron Pipe have always received full value. The remarkable rust-resisting quality of this alloy of refined iron, copper and molybdenum has saved millions of dollars for pipe users in every branch of industry.

But buyers of Toncan Iron Pipe today experience another advantage. All such pipe 2-inch and larger is made by Republic's Electric Weld Process—producing a better product at no increase in cost. This brings to this longer-lasting pipe many additional outstanding qualities—100% weld—uniform grain structure throughout—uniform inside and outside diameters and wall thickness—smooth, absolutely scale-free inside and outside surfaces—and long lengths up to fifty feet.

So you can readily see that Toncan Iron Pipe today really offers a two-fold advantage. And you can very easily prove it to yourself on your first trial.

Scores of actual cases where Toncan Iron Pipe has set new records are described in the new edition of "Pipe for Permanence." A copy will be sent upon request.

REPUBLIC STEEL

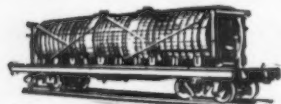
C O R P O R A T I O N

GENERAL OFFICES: YOUNGSTOWN, OHIO

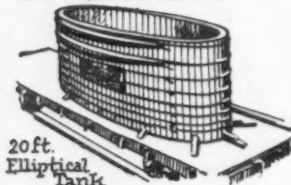




Rubber Lined Storage Tanks



Rubber Lined Tank Car



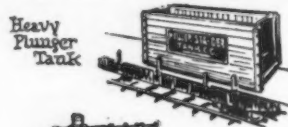
20ft. Elliptical Tank



Concave Bottom Tank



Rectangular Tank with Water Tight Compartments



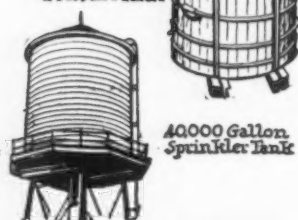
Heavy Plunger Tank



Tank Equipped with Self-Contained Agitator



Pressure Tank



40,000 Gallon Sprinkler Tank

**Wooden Tanks
Rubber Lined
Tanks (WOOD
or STEEL)
for all Industrial
Purposes
THE
HAUSER-STANDER
TANK CO.
CINCINNATI, OHIO**

Fabricating the Water Gates for Boulder Canyon Project

(Concluded from Page 13)

with a total of 12 openings, each opening connecting through entrance liners with the main reservoir. This nose liner, the complete assembly of which is pictured in Fig. 6, is also fabricated from steel plates bent or pressed to the proper shape and welded together.

The plates forming the nose were bent in a 1500-ton hydraulic press using a die built up of steel plates welded together. Similarly, the warped plates were shaped in the same press, using unmachined cast iron dies. Some development work was required in this case and it was necessary to reshape the die to some extent by chipping and filing to obtain the exact curvatures for all bent plates.

Assembly fixtures such as that shown in Fig. 7 were made up for detail assemblies, so that these parts could be held in proper relationship with each other before tack welding together in preparation for final welding.

In order to hold such detail pieces in the proper position for horizontal welding, special fixtures were made up; with these it was possible to rotate the entire piece and hold it in the proper position while welding at the various points.

The main assembly fixture shown in Fig. 8 clamped the nose pieces in the correct relation to each other and also held the top and bottom sections rigidly against the nose pieces and in the proper position for tack welding. Heavy tack welds were necessary to hold such parts together against the welding strains and to insure against distortion when handling as a completed segment before final welding. In addition it was necessary to add supplementary braces tack welded to the main members to prevent distortion while welding.

The nose liner segments were positioned by suspending them from overhead cranes and moving them to the desired position while welding. This provided a flexible and easily adjusted means of handling for horizontal welding.

Welded Parts Stress Relieved

All welded pieces were stress relieved in an electric furnace by heating them to 1300 deg. F. and holding at that temperature for one hour per each inch thickness of part, and then cooling them in furnace. The large car-type furnace for this work carried a gate segment and a nose liner segment, a total load of 70,000 lb.

In some cases it was found necessary to load the part to be annealed

so that during the heating period it would be bent back to exact shape by its own weight or by means of extra loads added at the required points.

After the proper welding procedure was determined very little trouble was encountered with cracked welds during the annealing period and none at all after the pieces were annealed.

To properly machine the parts and maintain the tolerances required for this class of work many special gages, machine set-ups and fixtures were necessary. These were of as simple design as possible and in practically all cases were fabricated of standard steel shapes welded together.

A complete assembly of all parts was made in the same manner as will be necessary in the field to form the complete water gate, in order to check the truth of the machined parts as well as the adequacy of the design as far as possible with a shop set-up. All parts fitted properly and tolerances were well within those allowed, without the necessity of hand fitting. The completed structure of fabricated and welded parts for all the heavy sections, with iron and steel castings for many small parts, gives the appearance of being unusually rigid and adequate for the purpose intended.

Edge Moor Will Make Irwin Gas-Fired Boilers

THE Edge Moor Iron Co., Edge Moor, Del., has acquired the right under the Irwin patents to manufacture and distribute the Irwin automatic gas-fired boilers for all purposes, including industrial, commercial and domestic use. President Ely C. Hutchinson announces that George H. Irwin has been appointed chief engineer of the Edge Moor-Irwin Gas Boiler Division, with Frank S. Luney as his assistant.

September Trackwork Shipments Increased

SEPTEMBER shipments of trackwork for rails 60 lb. and heavier amounted to 3845 net tons, according to the American Iron and Steel Institute. This compares with 3425 tons in August and with 1430 tons in September, 1932. Shipments in the third quarter, totaling 10,252 tons, were more than twice those of the corresponding 1932 quarter when 5117 tons was shipped.

YOU'VE WAITED FOR THIS WE'VE WORKED FOR IT---

NOW you can profitably use ARMCO STAINLESS STEEL sheets, strip and plates. They bear all the ripe experience, the fine quality, the assurance of bigger profits that you have long associated with the use of ARMCO Iron and Steel Products.

If you could have seen us working, experimenting, perfecting through these improving years, then you would realize why ARMCO STAINLESS STEELS were not offered to you before. Like every other ARMCO product, they had to be right for your most exacting needs. There could be no compromise with excellence where your interests and our reputation were at stake. They had to be *right*.

QUICK DELIVERIES From Warehouse Stocks

ARMCO 18-8

A Stainless Steel Alloy having exceptionally uniform tensile and hardness values with utmost resistance to corrosion. Armco 18-8 is ductile and tough, yet readily works and forms in a cold condition. Machining practices are easily adapted to the metal, while welds of great toughness and ductility can be made by any of the standard welding methods. Surface is marked by enduring clear color and varying degrees of lustre according to the finish desired. Corrosion resistance of Armco 18-8 is pronounced; it is not susceptible to attack by many of the common corrosive agents.

ARMCO

STAINLESS

STEEL

ALLOYS

Into ARMCO STAINLESS STEEL ALLOYS we have poured more than thirty years of metallurgical knowledge. The different finishes are as flawless as minds, hands and machines can produce. No

THE AMERICAN ROLLING MILL COMPANY

Executive Offices: Middletown, Ohio

ARMCO 17

A corrosion-resisting Stainless Steel Alloy metal possessing good heat-resisting proper-

ARMCO



STAINLESS STEEL ALLOYS

Ductile - Durable - Finely Finished

effort, time and money have been spared to provide stainless steel alloys that do precisely what you want them to do, economically.

You will pay no more for ARMCO STAINLESS STEELS, but your dollars will buy more value Value in the form of lower fabricating costs; value in improved appearance of your products; value in increased sales and satisfaction of the eventual buyer of those products.

Learn the advantages of ARMCO STAINLESS STEEL sheets, strip and plates. Our new handbook interprets these things in clear, concise manner. It is information you will want to have before you make your next purchase of STAINLESS STEEL. Just write: "I want your new book on ARMCO STAINLESS STEEL ALLOYS." It will be sent to you promptly.

ties up to 1500° F. It is very ductile and can be worked cold. Armco 17 is strong and stubbornly resists fatigue. Welding presents no major difficulties when the characteristics and behavior of the metal are understood. The surface, like Armco 18-8, is clear, even and lustrous. Corrosion resistance runs through a wide range, including air, moisture, salt water, nitric acid, dilute organic acids and kitchen chemicals.

GET THIS BOOK



This book was written especially for you. It is a thorough interpretation of Armco Stainless Steel Alloys, their composition, properties, characteristic finishes and their applications to your needs. It is a valuable reference work and guide book. Send for your copy—today.

Coke-Fired Reheating Furnace

(Concluded from Page 17)

was completely closed by removable iron doors, and air was supplied through parallel pipes, half-way across the grate, connected to a 3-in. main, *D*, that ran just below the gas main. Nine such pipes, of 1-in. internal diameter, were provided, their ends being bent downward to within 6 in. of the floor of the ash pit. A rotary fan blower supplied the air. As with the gas, the delivery of air from each air pipe could be controlled separately, or the whole could be controlled by a main valve.

The furnace had a flue, *H*, 2½ ft. from either end of the combustion space, each controlled by a damper, *G*, *G'*, and communicating with a single central stack, *F*. These arrangements allowed of the satisfactory adjustment of the temperature throughout the fuel bed, and, once the correct positions of the valves on the branch pipes for gas and air had been determined, control of the working temperature could be effected by the movement of the dampers only; or the main gas and air valves could be altered if a different working temperature were required.

Why the Coke Was Used

Although the results obtained with the refractory material were promising, it was evident that the high thermal capacity of the firebrick was a disadvantage when starting the furnace from the cold. When considering other materials, hard metallurgical coke appeared to offer advantages, namely, its reducing action on the products of combustion of coal gas, and the possibility, if excess air were used, of the coke contributing to the generation of heat within the furnace.

Broken and sized coke, through 2-in. and on 1½-in., was used, the depth of the bed being 6 in. and the weight of coke 6 cwt. (672 lb.) Three varieties of cokes, two by-product and one beehive, were tested, and it was found that the harder beehive coke was too reactive, burning away too quickly when there was excess of air. All subsequent tests, therefore, were made with by-product coke.

A test was made to determine the consumption of coal gas (500 B.t.u. per cu. ft.) and coke (12,400 B.t.u. per lb.) while maintaining the bed at a temperature of 1000 deg. C., no material being heated. The gas required was 750 cu. ft. per hr., and the coke consumed during a run of 8 hr., the temperature remaining constant at 1000 deg. C., was 1 cwt.

Subsequent industrial use of the furnace included (a) the heating (effected in 6 min.) of 15-ft. bars to 600 deg. C. for reeling; (b) the annealing

of 15-ft. round bars, 7/8 in. in diameter; and (c) the reheating of billets at 950 deg. C. All these operations were satisfactorily carried out, the bars being evenly heated throughout their length without any scaling, and the billets rolling well. The charge of billets (34, each weighing 38 lb.) took 1½ hr. to attain a temperature of 950 deg. C., and the thin scale formed on them separated readily at the first pass of the rolls.

Used for the Destruction of Smoke

Tests were made in which heavy smoke from a coal-fired furnace was passed into the ash pit of the gas and coke-fired furnace, the bed of which was at a temperature of 1100 deg. C. The tests were highly successful. No smoke issued from the stack of the furnace and the combustion space was filled with flame, which issued also from the doors of the furnace. The heat evolved by the combustion of the smoke allowed of the furnace temperature being maintained without the use of coal gas.

It is thus evident that the gas and coke-fired furnace can with advantage be used as the hotter of a pair of sheet-heating furnaces. The cooler, normalizing furnace can be coal-fired (the smoky atmosphere considered desirable for obtaining the "Sheffield" finish being obtained in the usual manner), and the smoke leaving the furnace can be usefully burnt in the hotter furnace. Tests of the atmosphere of the gas and coke-fired furnace when smoke was passed through it showed that less than 0.5 per cent of oxygen was present.

The Atmosphere Within the Furnace

Although scale formation could be prevented without much difficulty, it was found that, with high-carbon steels, some decarburization occurred. Laboratory tests with atmospheres of the same compositions as those within the furnace, under several different conditions of heating, showed that the principal cause of decarburization, there being no formation of scale, was the presence of traces of water vapor formed by the combustion of the coal gas and remaining undecomposed by the hot coke.



Tests were therefore made in which, after the coke bed of the furnace had been heated to redness by burning coal gas, the gas was cut off and the heat maintained by burning the coke alone. This arrangement was entirely successful. Temperatures ranging between 700 and 1100 deg. C. could be maintained at will, and the amount of water vapor in the furnace atmosphere did not exceed 1.4 per cent. Bars of 0.65 per cent carbon steel heated in the furnace for rolling were free from scale, and metallographic examination showed that there was less than 0.003 in. of decarburization.

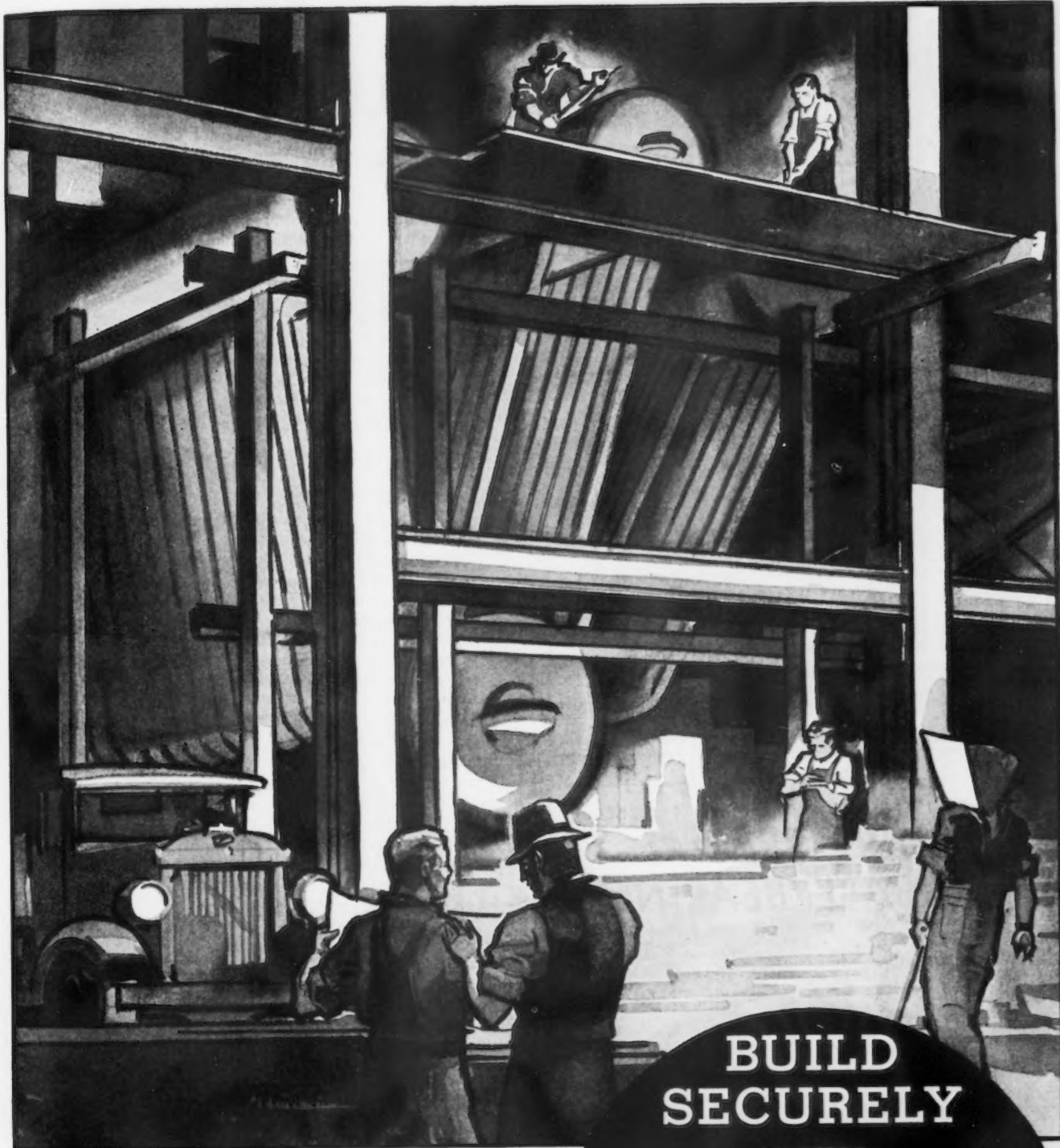
The atmosphere existing above the fuel bed at 800 deg. C. thus caused but little decarburization, despite the fact that it contained about 3 per cent of oxygen and no carbon monoxide. In laboratory experiments in which specimens of a 0.8 per cent carbon steel were heated during 2 hr. at 700 and 800 deg. C. in the atmosphere obtained when the fuel bed was at 1000 deg. C. (containing 8.4 per cent of carbon monoxide), no decarburization could be detected. Further specimens of the same steel were heated in that atmosphere during 2 hr. at 1000 deg. C., cooled down and then reheated during 2 hr. at 750, 800 and 850 deg. C. No marked change in weight occurred after heating at the lower temperatures, and the scale formed at 1000 deg. C. was not lifted.

It can be concluded that by increasing the depth of the coke bed, so as to introduce carbon monoxide into the atmospheres obtained with the lower fuel-bed temperatures, conditions suitable for the normalizing of steel sheets would be assured.

Furnace for Hardening Tool Steels

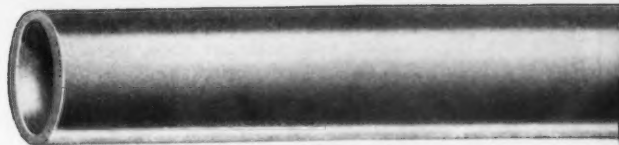
As a result of the experiments a furnace was built for hardening tool steels. It has a coke bed 36 x 22 in. and 9 in. deep, over a closed ash pit to which air is supplied under pressure. The firebars have deep webs so as to obtain a rapid transfer of heat from them to the ingoing air. To ignite the coke, a supply of coal gas, aerated by means of a "Sheffield forge" type of injector, is led to a series of burners, made of heat-resisting steel, beneath the firebars. As soon as the coke has ignited, the gas supply is cut off, but a portion of the air supply to the fuel bed is led through the gas pipes to cool them and to prevent dust from entering the burner holes.

When starting the furnace from cold, coal gas is burned for about 20 min., using about 100 cu. ft.; the working temperature can then be attained within a further 40 min. by using air alone. If the furnace has been used during the previous day, the coke bed retains sufficient heat to enable active combustion to be obtained, using air alone, in about 40 min.



BUILD
SECURELY
WITH

Pittsburgh
Seamless
BOILER TUBES



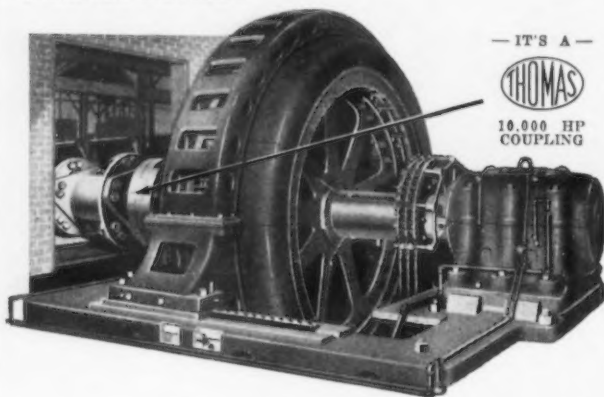
Heat Exchanger Tubes • Condenser Tubes
Still Tubes • High Pressure Piping
PITTSBURGH STEEL COMPANY
Pittsburgh • Pennsylvania

New York Detroit Chicago St. Louis
Tulsa Houston Los Angeles



THOMAS FLEXIBLE COUPLING

Operates on the Thomas frictionless principle, eliminating destructive back-lash, point or line contacts, noise, wear, or lubrication—and only a Thomas eliminates these undesirable drawbacks.



The above 10,000 H.P. THOMAS COUPLING was installed in 1921, and has operated ever since without a penny of maintenance expense or a single shutdown due to coupling trouble—that's proven dependable operating performance over a term of years, and is a record without a parallel in the history of the steel industry. Our new catalog tells of more record breaking THOMAS COUPLINGS in other industrial fields.

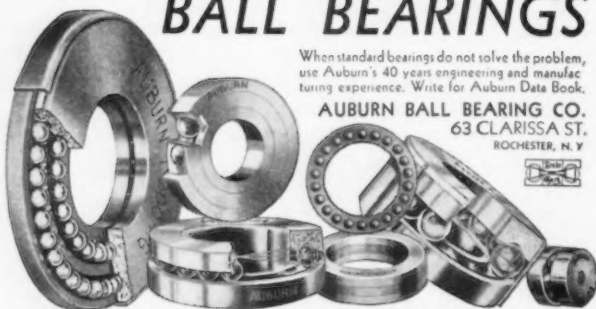


Flexible Coupling Company, Warren, Pa.

Flexible couplings exclusively since 1912

FOR THOSE EXTREME BEARING PROBLEMS

AUBURN SPECIAL BALL BEARINGS



When standard bearings do not solve the problem, use Auburn's 40 years engineering and manufacturing experience. Write for Auburn Data Book.

AUBURN BALL BEARING CO.
63 CLARISSA ST.
ROCHESTER, N. Y.

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.	New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.	Pennsylvania: Arch Machinery Co., 1605 Park Bldg., Pittsburgh, Pa.
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.	Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Philadelphia, Pa.
New England: Potter & Johnson Machine Co., Pawtucket, R. I.	California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.	

JUST BETWEEN US TWO

Lunatic Fringe

Publications are targets for the shafts of psychopaths with a Shakespearean complex. We receive our share. There is that elderly gentleman in New York State who sends us interminable, weird poems about sea-going white horses and patent stove lid lifters. Not long ago he mailed in an ad clipped from an 1875 issue of The Iron Age, and asked that it be mailed to the advertiser, a household pump company long since defunct.

Then there is that student of business conditions who gratuitously and fearsomely forecasts the trend of business by means of a weekly postcard. If any of our published ideas do not happen to click with his, Lord help us!

Zero Hour Is 2 A.M.

The latest missive from a marcher in the gray army is scrawled on the reverse side of a letter received from another publisher. It reads in part:

"We have heard that your books are wonderful, so we thought you would be glad to send The Iron Age to us for five years. But all books, bills and letters must be registered, return receipt requested and for any answers all people, even you, or a want ad must accompany registered postage included for all answers. This notice started in Oct. 2, 1933, at 2 A.M."

That "even you" burns us up. It's unfair! The signature is prefixed with the title "Hon. Gen." and the letter is countersigned by the "Commissioner," "Justice," "Deputy Commissioner," "Assistant Secretary," and "Assistant Treasurer." The "Hon. Gen." himself is general treasurer.

We'll never know why he selected the ungodly hour of 2 A.M. as the time for his ruling to become effective, for the "Hon. Gen." forgot to give us his address.

Subscription Price, \$240 a Year

A German medical periodical charges its subscribers \$240 a year. Gold marks, too. That makes our subscription price of \$6 look like chicken feed.

The chances are that a man gets more per dollar out of what he invests in trade papers than from any other expenditure he makes. While knowledge alone is no golden key, given the other qualities that make for success, the well-informed man gets there first.

Not being endowed institutions, trade papers depend on income from readers and advertisers to pay editors' salaries, contributors, and printing, paper and postage bills.

The importance and complexity of the field served by The Iron Age demand a large and competent editorial staff. If there is a trade paper with a larger staff, we don't know of it. We believe it to be true, too, that we lead all trade papers in number of editorial pages. In September we published 291 editorial pages, which is 40 per cent above any other metal-working paper's total.

All for 11½¢ a week. We gnash our false teeth when we see some of those financial services getting \$50 a year and up for telling their subscribers to buy when they should sell, and v. v.

Good Timing, Mr. Eastman

Federal Transportation Co-ordinator Joseph B. Eastman has a nice sense of timing. His latest blast against the price of rails was published coincidentally with our article revealing that the railmakers lie on no right of way of roses.

—A. H. D.